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December, 1946

JAN 1947
GEOGRAPHY, RESOURCES & INDUSTRIES

EDISON ELECTRIC INSTITUTE BULLETIN

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

October, 1945-1946

SOURCE AND DISPOSAL OF ENERGY—MONTH OF OCTOBER

	1946	1945	%
GENERATION* (Net)			
By Fuel Burning Plants	13,930,796,000	11,207,917,000	+24.3
By Water Power Plants	6,257,047,000	6,462,918,000	− 3.2
Total Generation	**20,187,843,000**	**17,670,835,000**	**+14.2**
Add—Net Imports Over International Boundaries	119,582,000	161,545,000	−26.0
Less—Company Use	124,758,000	119,289,000	+ 4.6
Less—Energy Used by Producer	398,280,000	152,151,000	.....
Net Energy for Distribution	**19,784,387,000**	**17,560,940,000**	**+12.7**
Losses and Unaccounted for	3,063,093,000	2,658,734,000	+15.2
Sales to Ultimate Customers	**16,721,294,000**	**14,902,206,000**	**+12.2**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of October 31st			
Residential or Domestic	29,519,865	28,029,863	+ 5.3
Rural (Distinct Rural Rates)	1,352,196	1,216,850	+11.1
Commercial or Industrial:			
Small Light and Power	4,653,056	4,359,363	+ 6.8
Large Light and Power	174,671	162,303	
Other Customers	120,918	118,771	.....
Total Ultimate Customers	**35,820,706**	**33,887,150**	**+ 5.7**
KILOWATTHOUR SALES—During Month of October			
Residential or Domestic	3,129,839,000	2,789,132,000	+12.2
Rural (Distinct Rural Rates)	410,225,000	390,455,000	+ 5.1
Commercial or Industrial:			
Small Light and Power	2,820,990,000	2,509,041,000	+12.4
Large Light and Power	9,064,186,000	7,826,351,000	+15.8
Street and Highway Lighting	206,373,000	196,550,000	+ 5.0
Other Public Authorities	470,720,000	555,137,000	−15.2
Railways and Railroads:			
Street and Interurban Railways	351,297,000	370,558,000	− 5.2
Electrified Steam Railroads	220,740,000	217,400,000	+ 1.5
Interdepartmental	46,924,000	47,582,000	− 1.4
Total to Ultimate Customers	**16,721,294,000**	**14,902,206,000**	**+12.2**
Revenue from Ultimate Customers	**$292,587,200**	**$271,413,100**	**+ 7.8**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—for 12 months ending October 31st			
Kilowatthours per Customer	1,312	1,208	+ 8.6
Average Annual Bill	$42.64	$41.56	+ 2.6
Revenue per Kilowatthour	3.25¢	3.44¢	− 5.5

(*) By courtesy of the Federal Power Commission.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 14 DECEMBER, 1946 No. 12

The Electric Light and Power Industry in 1946

Nearly Two Million New Customers Added to Lines—
Domestic Consumption Reaches New High

By Grover C. Neff
President, Edison Electric Institute

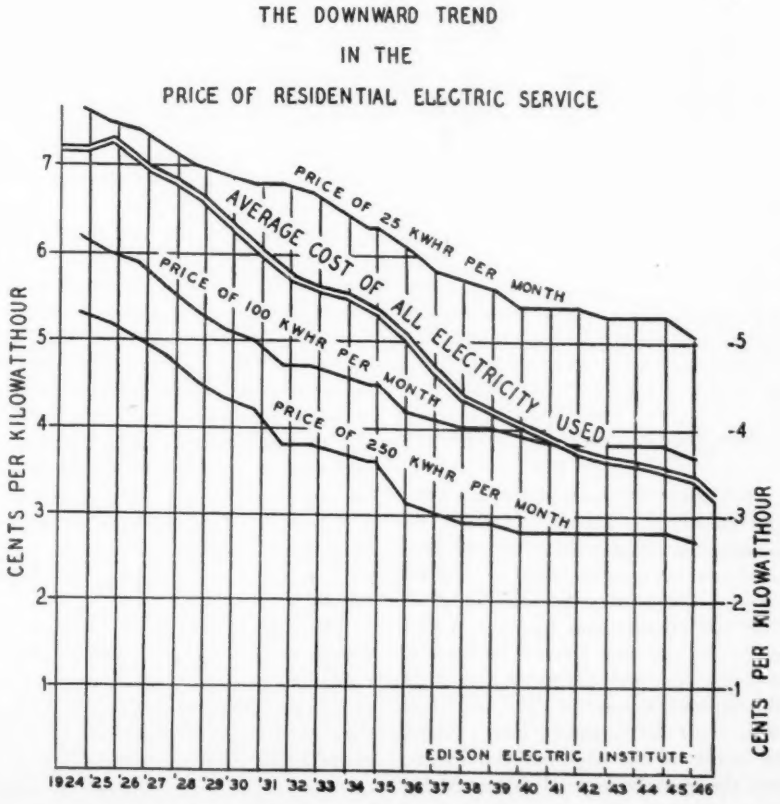
THE YEAR 1946 in the electric utility industry was a year of phenomenal growth in the number of customers served. Despite the housing shortage and difficulties encountered in procuring poles, wires and equipment, nearly 2,000,000 new customers were added. A backlog of over 600,000 applicants for service, waiting on materials and on availability of ample skilled labor, indicates that 1947 will match 1946 in new customers added. In a nation with 40,000,000 families, 90 per cent are now using electric service.

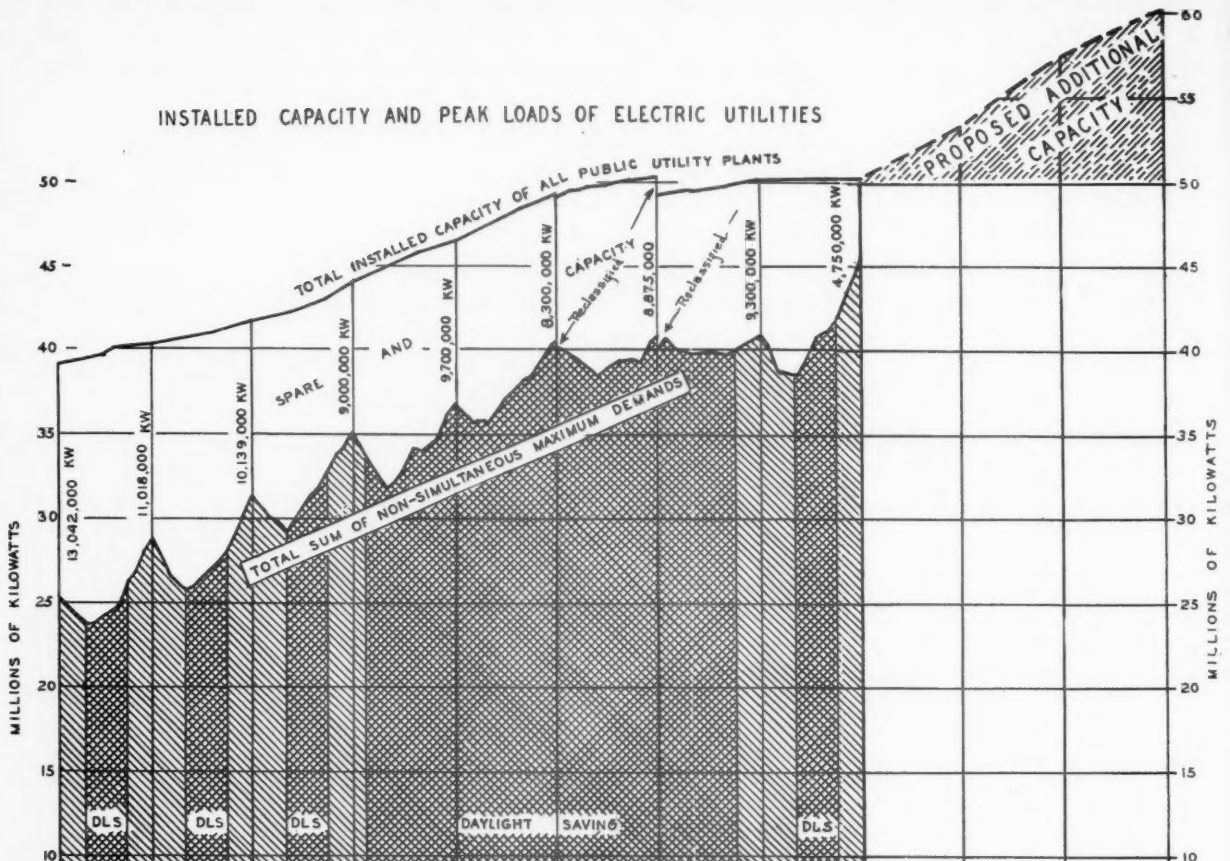
Another high record established in 1946 was the increase in average residential consumption of electricity, an increase of 100 kilowatthours, to set an all time high average of 1,330 kilowatthours used per customer. New consumption records were set by all classes of consumers except industrial.

Most of the new customers connected in 1946 were in the rural areas. Less than 400,000 of the residential customers originated within city limits. In excess of 500,000 farms were connected during the year, bringing the total number of electrified farms as defined by the U S Bureau of the Census to more than 3,400,000. This constitutes about 63 per cent of all occupied farms. Electric companies expect to serve another 600,000 farms during the next two years, and electric cooperatives and other public agencies are expected to add an equal number in the same period. Already three-fourths of all farms are reached by electric power lines, though some 700,000 of those reached are not yet taking service. In two more years the big task of erecting farm lines will be substantially completed, except for the most inaccessible farms, most of which already have or will have their own small generating plants.

Sales of Electricity

Total sales of electricity by all utilities, both company and governmental, approximated 191,000,000,000 kilowatthours, compared with 193,558,000,000 kilowatthours sold in 1945. Since the de-


THE DOWNWARD TREND
IN THE
PRICE OF RESIDENTIAL ELECTRIC SERVICE
PRICE OF 25 KWHR PER MONTH
AVERAGE COST OF ALL ELECTRICITY USED
PRICE OF 100 KWHR PER MONTH
PRICE OF 250 KWHR PER MONTH
CENTS PER KILOWATTHOUR
CENTS PER KILOWATTHOUR
1 2 3 4 5 6 7
1 2 3 4 5
EDISON ELECTRIC INSTITUTE
1924 '25 '26 '27 '28 '29 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46



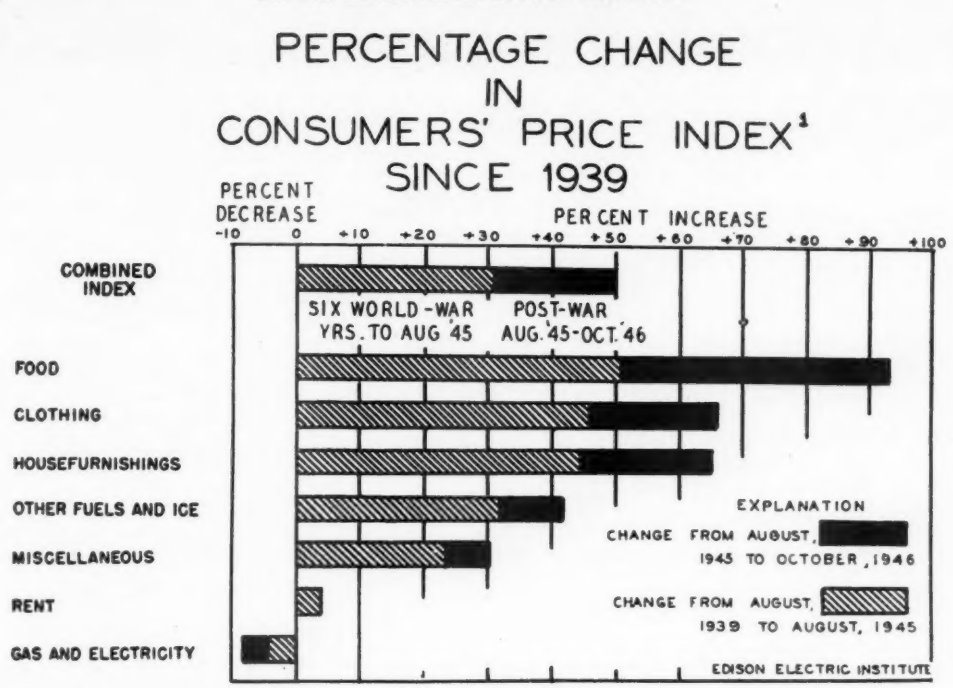
crease was in industrial power use sold at wholesale rates, while retail uses of electricity increased, annual revenues did not decrease but instead increased by 3 per cent to a total of $3,450,000,000.

New High in Household Use—New Low in Rates

During the year as a whole, the average residential customer increased his consumption of electricity by 100 kilowatthours, bringing the total to 1330 for 1946 as compared with 1229 in 1945. This 100 kilowatthour gain sets a new record in the year-to-year increase in household use and compares with a 78 kilowatthour increase in 1945 and 81 in 1944. It reflects, among other things, the results of the high national income and the greatly expanded purchasing power of the country. This is indicated by the greatly enlarged flow of electrical appliances into the American home. The production of portable room heaters, whose use was greatly increased with the threat of the coal shortage (to cite only one example) was 172,000 in September, as compared with a 1939 monthly average of only 44,000. Three-quarters of a million electric flat-irons were manufactured in October alone, as compared with a 1939 average of 416,000 per month.

The price of electricity continued its decline and the greatest number of rate reductions in recent years is indicated by the 4 per cent drop during the year in the cost of gas and electricity as determined by the Department of Labor. According to the U. S. Bureau of Labor Statistics, the "consumers' price index" (or cost of living) for all items rose from 128.9 per cent of pre-war figures in September, 1945, to 145.9 per cent on September, 1946. At the same time, the cost of gas and electricity dropped from 95.2 per cent to 91.7 per cent. While other items in the family budget are going up, the price of electricity has continued to go down.

Production of power by all electric utilities—both business-managed and publicly operated—is estimated at 222,500,000,000 for the year 1946. This is about the same as the 222,433,981,000 generated in 1945. Of the total, 143,000,000,000 was produced by steam, an increase of 2,500,000,000 units over the previous year. Hydroelectric production declined by 2,500,000,000 kilowatthours



[1] Formerly designated "cost of living" index.
Source: U. S. Department of Labor.

to an estimated total of 77,500,000,000 while generation by internal combustion engines was about the same as the 2,000,000,000 kilowatthours of 1945.

Due largely to strikes in the metal producing industries and in the plants of the principal electrical manufacturers, barely 150,000 of the 1,400,000 kilowatts of generating capacity scheduled for installation in 1946 actually went into service during the year. On the other hand, the maximum demands on the generating stations are estimated to have increased by some 4,700,000 kilowatts and the margin of spare and reserve capacity, which stood at 9,300,000 (or 23 per cent of the peak requirements) in December of 1945, has been whittled down to 4,750,000 kilowatts, or only 10 per cent.

The electric companies, however, plan to add about 8,500,000 kilowatts in generating capacity over the next three years. A total of 2,400,000 kilowatts is scheduled to be installed during 1947, with 3,500,000 kilowatts to follow in 1948, and already about 1,750,000 kilowatts ordered for 1949. The combined orders of companies, municipal and other governmental power agencies and of all industrial establishments for generating equipment for installation in the next three years has already reached the high total of 11,500,000 kilowatts to be added to a present combined total installation of 63,000,000 kilowatts.

Construction

Except for power houses, the construction budgets planned by the utilities for 1946 were consistently carried out. Total expenditures by the business-managed companies, the municipal plants and the rural cooperatives approximated $800,000,000 during the year. The outlook for 1947 is that this sum will be substantially exceeded. It is even possible that, if a recession does not intervene and if another wave of strikes does not again sweep over the United States, the business-managed electric power companies will spend one billion dollars for construction in 1947. At the present high prices, however, this represents in the employment of labor and the use of materials, no greater volume than in the years just before the war.

Entire Gain in Revenues Goes to Employees

Gross revenues of the business-managed electric power companies rose by about $100,000,000 or 3-1/3 per cent. All of this gain, however, was absorbed by increased wages. Payrolls now constitute the largest item of utility expense, now having nosed out taxes from top place.

Most of the estimated saving of $60,000,000 resulting from the ending of the excess profits tax was offset by increased costs in fuel and general expenses so that the year 1946 finally showed a gain in operating income of only $15,000,000 out of the additional $100,000,000 in gross revenues. Because of refunding operations, however, the electric companies paid some $80,000,000 less to their bondholders than they did the year before, and 1946 showed an increase of $95,000,000 in the net income available for dividends, additions to working capital and surplus funds to a grand total of $630,000,000 for a 13-billion dollar industry. While this represents the highest figures so far recorded, it is only 5 per cent more than it was in 1930 when invested capital was at least 25 per cent smaller.

Outlook for Load Growth

Based on estimates of companies representing two-thirds of the industry, the load growth in 1947 is expected to be 7 per cent and in 1948 6 per cent, compared with a pre-war normal annual growth of 3 to 4 per cent.

The large building program of the electric utility companies—8,500,000 kilowatts in the next three years—is planned to keep ahead of this high rate load growth. Most of the companies, however, do not expect to be able to build up their margins of reserve and spare generating capacity before the autumn of 1949.

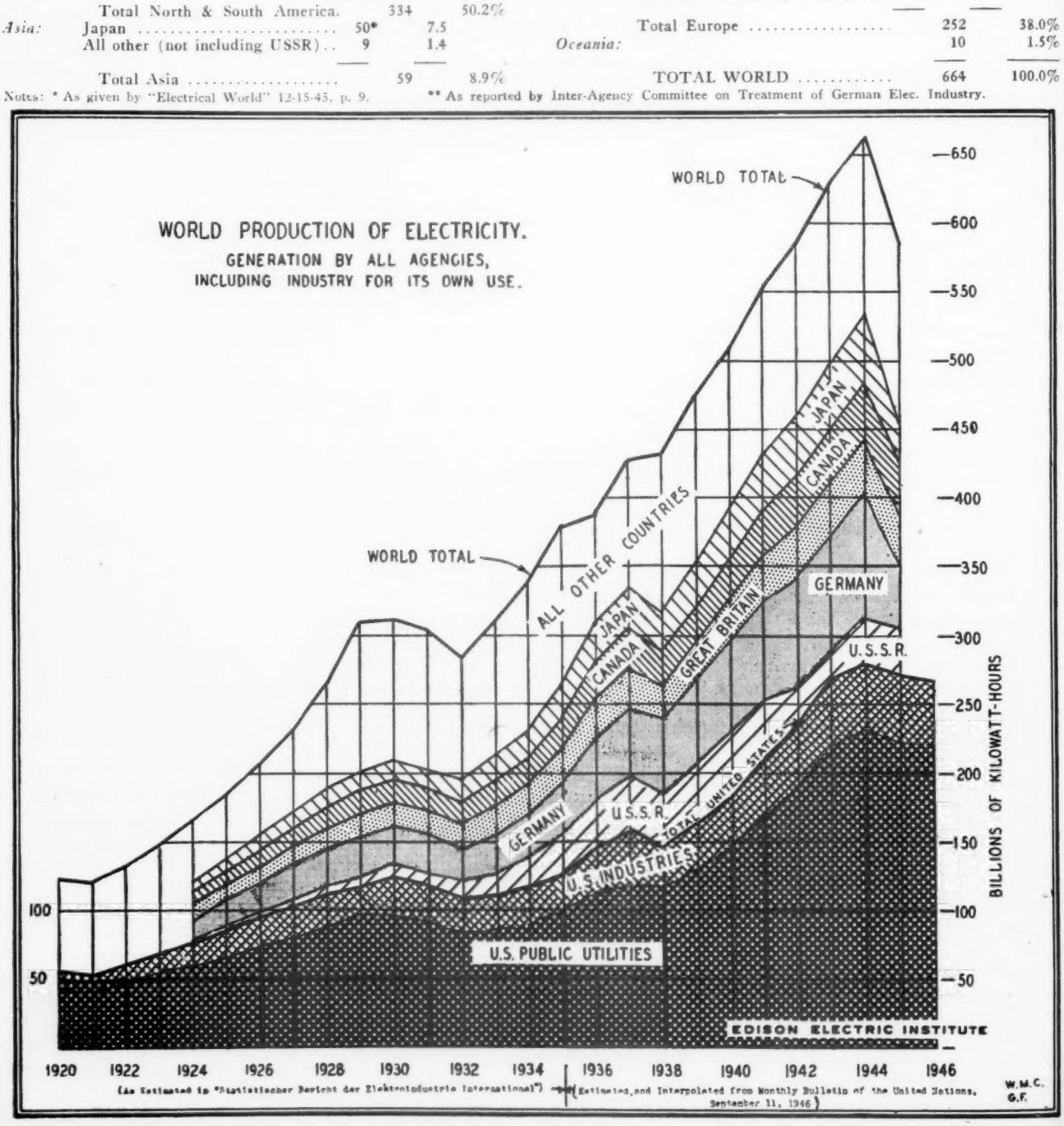
World Power: United States Produces Two-Fifths

War made little change in the continuous growth of World electrical production; the dislocations in the combat areas being offset by increased output elsewhere. The slump following the economic collapse of Central Europe at the end of the War will, however, be plainly visible in the 1946 figures when they are made available.

The Monthly Bulletin of Statistics, published by the United Nations at Geneva on September 11, 1946, contains a special supplement giving a table of World Production of Electricity from 1936 to 1945. Using estimates based upon all available information for unreported countries and intervening years, this table has been extended by the Edison Electric Institute to global proportions, the figures for 1944 being shown in the table and intervening years illustrated graphically on the accompanying chart:

		Billions Kwhr	Percent of World Total
Africa:	Year 1944	9	1.4%
Americas:	Canada	41	6.2
	United States (Utilities)	231	34.7
	United States (Industries)	49	7.4
	(Total U. S. A.	280	42.1)
	All Other Countries	13	1.9
	Total North & South America.	334	50.2%
Asia:	Japan	50*	7.5
	All other (not including USSR)	9	1.4
	Total Asia	59	8.9%
Europe:	France	14	2.1
	Germany	90**	13.6
	Great Britain	40	6.0
	Italy	12	1.8
	Norway	11	1.7
	Sweden	12	1.8
	Switzerland	9	1.4
	All other (including USSR)	64	9.6
	Total Europe	252	38.0%
Oceania:		10	1.5%
	TOTAL WORLD	664	100.0%

Notes: * As given by "Electrical World" 12-15-45, p. 9. ** As reported by Inter-Agency Committee on Treatment of German Elec. Industry.



Industry Plans Extensive Celebration of Edison Centennial

By Clarence L. Law
Chairman, EEI Edison Centennial Committee

THE SCOPE of the Thomas A. Edison Centennial, which will occur next February 11th, is growing steadily as the plans of electric power companies, professional societies, electrical leagues and other business, civic and educational organizations for fitting celebrations of this event take definite form. The electrical industry, together with the many other industries that have benefitted from the genius of Edison, will take part in the Centennial through the sponsoring of Edison Dinners, newspaper and other forms of advertising, radio programs, contests and many other methods of participation.

Much of the material prepared by the Thomas A. Edison Centennial Committee of which Frank M. Tait, Chairman of the Board of Dayton Power & Light Company, is Vice Chairman, and the EEI Edison Centennial Committee, is being put to good use by power companies and others throughout the country, in making their plans for local celebrations. An eighty-page collection of background material on the inventor's life and achievements, which is proving helpful in providing data for advertising, speeches, radio programs, etc., has been sent to member companies by the EEI Committee.

Much of the advertising and display material to be made available by outside agencies was described in my article in the October EEI Bulletin. Other promotional aids which have been announced during the interim are described in the latter part of this article.

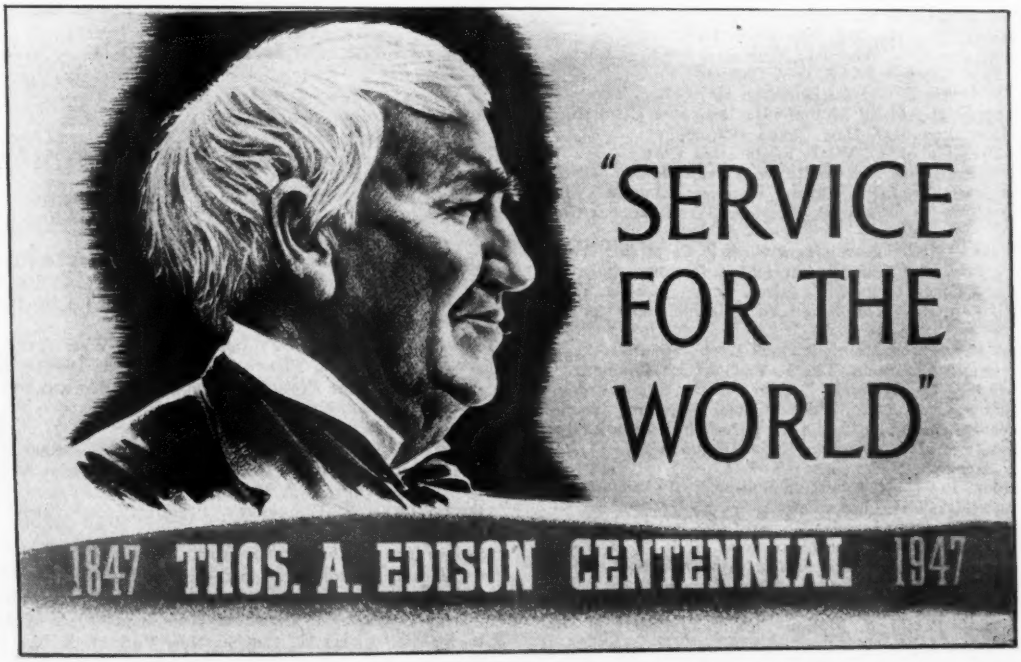
"Pageant of Light" Scheduled at Fort Myers, Florida

One of the most extensive programs now being planned is the Edison "Pageant of Light," which will be held at Fort Myers, Florida, where Mr. Edison's winter laboratory was located. The pageant, which will extend from February 8th to the 16th, is being sponsored by the Junior Chamber of Commerce in cooperation with civic groups and the Florida Power & Light Company.

The pageant will be formally opened at the Fort Myers Civic Center on the evening of the 8th, with addresses by the Mayor and other community leaders. A musical concert will feature this event, and will be followed by a court ball, at which a King and Queen of the pageant will be crowned by Mrs. Thomas A. Edison.

Several tennis and golf tournaments will be held during the week of the pageant. An Army air show is scheduled for February 9th. Other events to be held as a part of the pageant include a baby parade, a choral concert, flower pageant show, boat races, street dances and several parades.

A candid camera and motion picture contest will be staged, and a fishing contest will be held every day during the



A 4-color, 24-sheet billboard poster designed by the Advertising Department of the Consolidated Edison Company

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MRS. THOMAS A. EDISON
HONORABLE CHARLES EDISON

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S. B. WILLIAMS, Editor, Electrical World.
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ROBERT D. YARNALL, President, American Society of Mech. Engrs.
VICTOR YOUNG, 113 W. 57th St., New York 19, N. Y.

week. The Fort Myers Little Theatre will present a play written especially for the pageant.

Edison Dinner Sponsored at New Orleans

The Electrical Association of New Orleans is making plans for an Edison Dinner, which will be held either February 20 or 21, as a climax to a week of general activities. Since February 11 falls during Mardi Gras week, the Association felt that a one week postponement would allow a more intensive cooperation by all branches of the electrical industry in the area, and do proper honor to the memory of Edison.

Charles Edison will be invited to address the dinner, according to J. Rudolph Guidroz, Secretary of the Association. Electrical pioneers of the New Orleans area will be guests of honor at the dinner.

An honorary committee of leading business and civic officials will be in charge of the arrangements for the dinner. Among the committee members are the Mayor of New Orleans, and the Governor of Louisiana.

Department stores and electrical dealers of the city will participate in the centennial with extensive newspaper, radio and window display advertising. Activities of the New Orleans Public Service, Inc., will be publicized in connection with the centennial, and include a new power station, and a demonstration of mobile radio telephone operation. The telephone company will stage an "Open House" during the week.

An Army and Navy show of their new equipment, which is based upon Edison discoveries, will also be a part of the activity. The Association will furnish educational literature on Edison's life and achievements to churches in the city which may be used as material for sermons, and also to scouting organizations, for distribution to Boy and Girl Scouts.

Special Edison programs will be put on at universities in the area. Private and parochial school systems will also cooperate in the centennial.

The Electrical Association will also furnish five-minute speakers to luncheon clubs, who will be prepared to speak on the life and work of Edison, and the meaning of the Centennial.

Special events scheduled for the week include flood lighting displays, and demonstrations of sky writing by units of the Army and Navy.

Philadelphia Association Plans Edison Tableau

The Electrical Association of Philadelphia plans to sponsor an Edison Dinner, at the Bellevue Stratford Hotel the evening of February 10th, since a previous reservation had been made for the Hotel's grand ballroom on the 11th. A speaker of national importance will address the gathering, which will include leaders of many industries which have benefited from Edison's inventions.

One of the high spots of the dinner will be a tableau representing Edison and his assistants in his laboratory the night of October 21, 1879, when the secret of electric light was discovered. Every effort will be made to have the tableau closely resemble the original scene.

A local Edison Centennial Committee has been organized by the Electrical Association to handle the arrangements for the dinner, and is headed by George E. Conover, Vice President of the Philadelphia Electric Company.

Newspaper advertising featuring the Centennial will be placed by the electric company, the Electrical Association, individual dealers and department stores. Window display and radio advertising will also be used, with outdoor advertising tentatively scheduled.

Southern California Edison Plans

The Southern California Edison Company will have window displays featuring the Centennial theme in all of its 72 offices during February, according to Howard W. Hayes, advertising manager of the company. Each office will also have a large portrait of Mr. Edison as an interior display.

The company's customer publication, with a circulation of 400,000 will have a four-color picture of Mr. Edison, with an article on his life and achievements. Advertising on the Centennial will be placed by the company in 176 newspapers, and in 40 local magazines.

W. C. Mullendore, President of the Company, will address the Los Angeles Electrical Club at a Centennial Luncheon on February 10th. The Company is also arranging to have each service club in its territory give time at a meeting date near February 11th for a tribute to Edison, and many clubs will devote their entire programs during this week to the Centennial.

Consolidated Edison Company Plans Extensive Tie-In

The Consolidated Edison Company of New York, Inc., will feature the Centennial on its "Echoes of New York" radio program, a half-hour show presented each Tuesday evening and which will be heard on February 11th. Appropriate newspaper and radio advertising will be employed in connection with the Centennial throughout the month of February.

Articles on the Centennial will be

EEI SPECIAL COMMITTEE ON EDISON CENTENNIAL

Chairman, CLARENCE L. LAW, Consolidated Edison Co. of N. Y., Inc., New York.

J. M. BARRY, Alabama Power Company, Birmingham, Ala.
S. R. BERTRON, Houston Lighting and Power Company, Houston, Tex.
H. C. BLACKWELL, Cincinnati Gas & Electric Company, Cincinnati, Ohio.
C. P. CRANE, Consolidated Gas Electric Light & Power Company, Baltimore, Md.
R. D. CUTLER, The Hartford Electric Light Company, Hartford, Conn.
J. E. DAVIDSON, Nebraska Power Company, Omaha, Neb.
G. A. DAVIS, Oklahoma City Gas and Electric Company, Oklahoma City, Okla.
R. E. DILLON, Boston Edison Company, Boston, Mass.
G. M. GADSBY, Utah Power and Light Company, Salt Lake City, Utah.
R. D. JENNISON, New York State Electric and Gas Corp., Binghamton, New York.
C. W. KELLOGG, Langshaws, Queen Anne, Maryland.
WILLIAM KELLY, Buffalo Niagara Electric Corp., Buffalo, New York.
J. E. LOISEAU, Public Service Company of Colorado, Denver, Colo.
P. H. MCCANCE, Duquesne Light Company, Pittsburgh, Pa.
A. D. MCLAY, The Detroit Edison Company, Detroit, Mich.
C. E. MICHEL, Union Electric Company of Missouri, St. Louis, Mo.
W. C. MULLENDORE, Southern California Edison Co., Ltd., Los Angeles, Calif.
GROVER C. NEFF, Wisconsin Power & Light Company, Madison, Wis.
W. E. PARROTT, Ebasco Services, Inc., New York.
A. B. PATERSON, New Orleans Public Service Inc., New Orleans, La.
J. H. POLHEMUS, Portland General Electric Company, Portland, Ore.
K. M. ROBINSON, The Washington Water Power Company, Spokane, Wash.
F. J. RYAN, Cleveland Electric Illuminating Company, Cleveland, Ohio.
C. C. SMITH, Kansas City Power & Light Company, Kansas City, Mo.
C. J. STRIKE, Idaho Power Company, Boise, Idaho.
EDWIN VENNARD, Middle West Service Company, Chicago, Ill.
A. C. WATT, The Commonwealth & Southern Corp., New York.
A. E. WISHON, Pacific Gas and Electric Company, San Francisco, Calif.
C. E. WHITWELL, Philadelphia Electric Company, Philadelphia, Pa.
H. E. YOUNG, Northern States Power Company, Minneapolis, Minn.
P. S. YOUNG, Public Service Electric & Gas Company, Newark, N. J.

carried in the company's customer publication, with a circulation of 2,000,000, and in its house organ, which is received by 30,000 employees. Centennial posters will be used in dealer windows throughout the company's territory, and many dealers plan to feature the Centennial in their own advertising.

All of Consolidated Edison's advertising and publicity will be built around the theme of the outdoor advertising poster illustrated on page 405, and which has been made available by the company to the National Edison Centennial Committee.

The Electrical and Gas Association of New York City plans to sponsor a Centennial Luncheon on February 10th, which will be addressed by an outstanding speaker.

Other Electric Companies Announce Plans

The South Carolina Power Company plans to tie-in with the Centennial through extensive newspaper and radio advertising according to H. M. Pace, Vice President of the Company. During the week of February 9th, Edison's work and achievements will be stressed in the Company's advertising, and will appear in three daily and twenty-one weekly newspapers.

Nine radio programs originating in the area will feature the Centennial. Window displays directly employing the Centennial theme will be used in the power company's show windows in fifteen cities and towns in the area served.

Department stores too are finding many opportunities to participate actively in the Centennial program. The J. L. Hudson Company of Detroit, for example, is considering the possibilities of an exhibit of modern electrical appliances and equipment, to be held in connection with the Centennial, and on a tentative cooperative basis with the Detroit Edison Company. Other types of promotional and educational activities directly tied-in with the Centennial are also under consideration by the store.

The American Institute of Electrical Engineers has urged its seventy-five sections throughout the country to plan Edison Centennial activities, either as sponsors or in cooperation with other groups. In New York City, the AIEE will sponsor, with the cooperation of other outstanding professional groups, an Edison Dinner on February 11th at the Waldorf-Astoria Hotel. Many of the local sections have signified their intentions to take an active part in the Centennial celebration.

The Northern California Electrical Bureau of San Francisco is considering the use of the series of eight educational posters describing Edison's life and work in schools in its area. Newspaper and radio advertising in connection with the Centennial is also tentatively planned by the Bureau, as is the use of 24-sheet posters in outdoor advertising. An Edison Luncheon is also under consideration, with an address by an outstanding speaker.

GM's "Previews of Progress" Features Edison

An example of how some manufacturers are tying-in with the Centennial observation is the General Motors Corporation's demonstration entitled "Previews of Progress" which will feature Edison's original phonograph and electric light in its 1947 presentation. One unit which puts on this show is now touring the country, and averages audiences of 4,000 weekly.

A replica of Edison's tin-foil phonograph is demonstrated to the audience, and is followed by way of contrast with the playing of modern plastic records. Another exact replica of the 1879 electric lamp bulb glows feebly, and is compared with modern electric lighting.

General Motors plans to have five such units touring the country during 1947, with prospective audiences of about 20,000 each week.

Edison Music to be Featured on Radio Programs

Another national radio program which will feature Edison music during the week of February 11th is "Invitation to Music," a half-hour show appearing on the Columbia Broadcasting System. This brings the total of national programs cooperating with the Centennial to five, with several others expected to announce their plans for participation in the near future.

Victor Young, a distinguished musician who was formerly associated with Mr. Edison has written an "Edison March." This music will be copyrighted by January 3rd, and is expected to be generally available at music stores within a week or ten days after that date.

The "Hour of Charm" radio program, sponsored by the group of electric companies engaged in a national advertising campaign, will pay tribute to Edison's memory in its February 9 broadcast. The program will be heard at 4.30 p. m. Eastern Standard Time, and will originate in Cleveland, Ohio.

The program will feature music that the great inventor was particularly fond of, and announcements will describe the Centennial celebration, with highlights of Edison's life and achievements.

U S State Department Prepares Edison Film

The international aspect of the Centennial has taken on new significance with the preparation of the U. S. State Department of a documentary motion picture on the Life of Edison. This film will be distributed throughout the world, as part of the effort to improve foreign understanding of American Institutions and theories of government.

Every effort is being made to have the film completed by the date of the Centennial, although distribution plans now call for the film to be handled only by United States embassies and legations. The proposed picture will be accompanied by dialogue in 20 different languages.

New Promotional Materials Available

The Consolidated Edison Company of New York, Inc., is making available a 24-sheet, 4-color billboard outdoor poster, suitable for use by power companies or electrical leagues during February.

Designed by the Advertising Department of Consolidated, the posters carry a fine portrait of Edison, and text which reads, "Service for the World." At the base of the design is the line "1847—Thomas A. Edison—1947." Consolidated Edison will display this poster on 235 billboards in its operating area.

A smaller poster, similar in design, which is 28 in. x 44 in., has also been prepared by Consolidated, and is planned for use in window and interior displays, and on delivery trucks.

These posters are available through the Thomas A. Edison Centennial Committee, 40 W. 40th Street, New York.

Portraits of Mr. Edison, designed for use in window displays, etc., are available through the Hudson Press, 350 Hudson Street, New York 14, N. Y. These portraits are 22 in. x 27½ in. and are furnished in four colors. Each portrait is finished with a facsimile of the artist's brush marks, and treated with varnish, to resemble an oil painting. The paintings are sold singly at $2.75, and in lots of 10, at $2.40 each. Other promotional material available has been described in an earlier article.

Atomic Energy

By Col. William Kelly

Chairman of the Executive Committee, Buffalo Niagara Electric Corp., Buffalo, N. Y.

KNOWLEDGE of the real nature of atoms is comparatively recent, having been developed to its present state during the past 40 years. There is still much about atoms that is not known. For those who are not familiar with the subject, the following brief layman's explanation is offered:

An atom consists of a central core called a "nucleus" surrounded by electrons. The nucleus consists of one or more protons which have positive electrical charges, and practically all of them have at least an equal number of neutrons which have no electrical properties. The electrons, which revolve about the nucleus, have negative electrical charges equal in power to the positive charges of the protons. The number of electrons in a stable atom equals the number of protons.

The chemical changes with which the world has been familiar for centuries are due to the formation of molecules in which the nuclei of the atoms involved remain unchanged, while the surrounding electrons are rearranged. The release of atomic energy is the result of a change in the nucleus of the atom.

The Energy of the Atom

The atom is so small that even the largest are invisible under the strongest microscope yet developed. This fact adds greatly to the problem of studying atoms.

The scientists are entitled to great credit for what they have accomplished under such difficult conditions.

The energy in the atom is represented by the formula $M C^2$ in which M is the mass of the atom and C is the velocity of light. The mass, as just stated, is infinitesimal, but the velocity of light is 186,000 mi per second; consequently, the energy in the atom is tremendous.

It seems unlikely that all the energy in an atom can ever be put to use. At present all that seems possible is the use of a part of the force that binds the nucleus of the atom. Experiments indicate that this binding force is higher for both the light and the heavy elements than it is for those of mean atomic weight. Thus, if two or more light elements could be combined into an element of mean atomic weight, there would be a release of energy or, if a heavy element can be split into two elements of mean atomic weight, there will be a release of energy.

U-235, Chain Reacting Atom

Laboratory experiments developed over the past 15 years, and prior to World War II, had succeeded in changing the nuclei of certain atoms. This transmutation sometimes released energy and in other cases absorbed energy, but no continuing or chain reaction had been discovered. Scientists had come to the belief, however, that success in developing a chain reaction for release of atomic energy was more likely to occur from splitting the heavier atoms than it was from combining the lighter ones. Many experiments were made in the hope of splitting the uranium atom U 238, the heaviest atom found in nature. They were only moderately successful because of the ability of U 238 to absorb the neutrons used in projectiles. During the experiments it was discovered that uranium contained two different atoms, U 235 and U 238. The U 235 atom occurs in the proportion of one to 140. The U 235 atom could be split with the release of one to three neutrons which, in turn, were capable of splitting other atoms of U 235. It was believed that if the proportion of U 235 atoms in uranium could be sufficiently increased, a chain reaction would occur.

The chain reaction is somewhat analogous to the combustion of fuel. When heat is applied the fuel ignites, releasing more heat, which in turn, ignites more fuel, and the combustion continues until the fuel is consumed.

The Manhattan District

During the war, our Government became convinced that Germany was working hard to produce an atomic bomb so, in collaboration with England and Canada, we decided to beat Germany to it. The Manhattan District was organized for this purpose. A general account of the development of methods of using atomic energy for military purposes has been published by Dr. H. D. Smyth, Chairman of the Department of Physics of Princeton University, and a Consultant to the Manhattan District. It can be purchased from the Superintendent of Documents, Washington 25, D. C., for 25 cents. (It is not recommended for light reading.) It covers the activities of the Manhattan District from 1940 to 1945, during which time we spent over two billion dollars and produced successful bombs, which all the world has heard about. Of course, Dr. Smyth's account gives little of the quantitative data which had to be developed before success could be achieved.

Briefly, the Manhattan District consisted of the Clinton Engineering Works, Tennessee; the Hanford Engineering Works, Washington; and the Los Alamos Laboratory, New Mexico, all built by the Government. Much of the experimental work was done by various university laboratories, notably that of the University of Chicago, where the "Metallurgical Laboratory" was established as part of the Manhattan District.

It was believed that a bomb of U 235 could be made if a process of separation from U 238 could be found. U 235 and U 238 are chemically identical, so no chemical process could be used. The difference in weight between U 235 and U 238 is so slight that diffusion and centrifugal processes, while possible, are not efficient. An ionization process by use of a very powerful electromagnet proved the most effective of all the processes tried. It is understood that the bomb used at Hiroshima was made of U 235.

Plutonium, Newest Chain Reacting Element

Plutonium had been discovered before the Manhattan District was started. When U 238 is bombarded by neutrons, it absorbs neutrons and forms neptunium U 239. Neptunium, after two successive beta emissions, becomes plutonium. Plutonium is fairly stable, but it, like U 235, is capable of sustaining a chain reaction. It is chemically different from uranium, and therefore can be separated by chemical process.

The Hanford Plant was built on the belief that if very pure uranium and very pure graphite could be obtained, a pile could be constructed that would sustain a chain reaction. Impurities in the materials used in the pile absorb neutrons

and stop the chain reaction. The Hanford pile proved successful, and it is understood that the Nagasaki and Bikini bombs were made of plutonium. A pile of this type generates a tremendous amount of heat and a great quantity of deadly radioactive products. The entire operation has to be carried on by a distant control and the development of safe and effective controls was no small engineering feat.

The explosive effect of an atomic bomb is tremendous and the heat effect, while of short duration, is great, but neither of these effects is as hard to combat from a military point of view as are the radioactive effects. At least 30 radioactive isotopes have been identified in the products of fission, some of them of very long lives. The atomic bomb will not be particularly effective against military personnel and material. Its deadly effect is established when it is used against concentrated civilian populations and structures, attack upon which was supposed to be outlawed by the Geneva Convention.

The general theory of atomic energy is known to scientists all over the world, and there is every reason to believe that any nation willing to spend the labor and materials can eventually succeed in making atomic bombs.

The Atomic Energy Act of 1946

Of course, we are all hopeful of finding some practical and enforceable way to prevent the use of atomic bombs in future wars. Our elder statesman, Mr. Baruch, headed up a committee which has recommended a plan now before the United Nations. Based largely upon this plan, Congress passed the Atomic Energy Act, approved August 1, 1946. The Act provides for the following major programs:

1. Assisting and fostering private research and development to encourage maximum scientific progress.
2. Control of scientific and technical information and for its dissemination when safeguards against its use for destructive purposes are devised.
3. Federally conducted research and development to assure the government of adequate scientific and technical accomplishment.
4. Government control of production, ownership, and use of fissionable material to assure the common defense and security.
5. Establishment of an administration consistent with the foregoing policies and with international arrangements made by the United States, which will enable Congress to be currently informed.

A commission of five members was appointed by the President under the Act on October 28, 1946, with Mr. David E. Lilienthal, of TVA fame, as chairman. The act also provides for a general manager and four divisions, covering: 1. Research; 2. Production; 3. Engineering; and 4. Military Application. In the course of some 20 pages the Act confers the most absolute powers on the commission that any commission in this country has ever had. It defines certain activities as dangerous and others as safe to permit under license from the commission. Dangerous activities can be carried on only by the Federal Government. Activities capable of producing fissionable materials in quantity are defined as dangerous. This means that piles of the Hanford type can be built and operated only by the commission, with the probable result that power development from such piles will be made by the commission, and by nobody else.

Any private company desiring to produce power from atomic energy must obtain a license from the commission, under which it may purchase from the commission fissionable material, probably denatured. The advocates of nationalization of industry consider this a great opportunity to advance their cause.

Outlawing Military Use of the Atom

Doubtless, an international agreement to outlaw the use of atomic bombs is desirable, but such an agreement can be enforced only so long as there is sufficient police force behind it. We should not overlook the fact that the fear of retaliation might also prevent the use of atomic bombs by an aggressor as it did the use of poisonous gas in the last war. Our country and the later generations of the British Empire and of France have been so slow in exercising police powers of an international character that up to now they have been entirely ineffective in preventing wars. In a representative country it takes a long time to arouse public opinion to the point of risking war by exercising international police powers.

In the hands of a determined and irresponsible leader democratic government seems to lead a nation suffering economic troubles into totalitarianism. Unfortunately, it also appears that people cannot be held in that state for long without a national emergency, such as a war, to make them willing to continue the sacrifice of personal liberty, incident to the totalitarian system.

The principles of revolution followed in Russia, Italy, and Germany to bring about totalitarian governments are as thoroughly worked out as are the principles of Machiavelli, but the general public does not seem to understand them nor to appreciate what a totalitarian government will do to them. The best safeguard a democracy like ours has against such aggressors is to keep itself so sound economically and politically that the aggressor will believe that he cannot overcome us.

The Atom Influences Our National Security

The problem of military preparedness is a very difficult and serious one for a democracy like the United States. The term, "Military Preparedness" confuses many people to the extent of leading them to put the cart before the horse. What we really want is National Security. National Security depends upon three things: The first is political soundness and stability in our own country, and political ability to understand and deal with other nations. Political action has always controlled our military actions, and not the reverse. The second is economic soundness and industrial ability to provide a high standard of living and the potential ability, in event of war, to produce what we need faster and in greater quantities than other nations. Aggressors generally have been slow to attack countries with superior industrial capacity. The third is a military system with sufficient manpower to meet the minimum requirements of a police force to support our political policies. Its size and character should be determined by our political policies. The full time military force should be backed up by a part time reserve, such as our National Guard, Organized Reserve and Reserve Officers furnished after World War I. Our military force must be capable of prompt and large expansion. This cannot be attained in these days of modern weapons unless we add basic military training to our compulsory educational system. A large standing army for defense is like a Maginot Line, it soon becomes obsolete. It is not a sound asset either politically or economically. An aggressor, knowing how a standing army is equipped, can provide himself with bigger and better weapons to overcome it. We must have military schools like the War College to train officers for high command and, finally, we must provide funds and facilities for research in and development of military tools.

A Foreign Policy to Insure National Security

Perhaps what we need most today is to improve our political setup in its relations with other nations. We have too few statesmen who know the underlying

principles of statesmanship or who know the problems of the other nations we must live with, and very few of the statesmen we have are ever called into consultation by our political leaders. Our system of gathering information about other countries is entirely inadequate to keep our statesmen properly informed. The most encouraging development we have had recently is the establishment of a group representing the State, War, and Navy Departments to study all phases of National Security. This is a sort of outgrowth from the Army War College and if given time and political support, it should be of great value to our country. Never in the history of our country has the need been greater for public understanding of what it takes to maintain National Security.

To get back to the subject of atomic energy, it is very unfortunate that it was first introduced to the world in the form of a bomb, because that has generated political restrictions in the form of the Atomic Energy Act, which will greatly delay and impair commercial and beneficial uses of atomic energy. At the present state of development it is hazardous to prophecy what atomic energy may do for the world, but many people are spending a lot of time trying to find out.

The Future of Atomic Power in Industry

The piles of the Hanford project develop a great amount of heat, but at a temperature too low for power development. It is quite probable that such piles can be safely operated at a higher temperature and it is reported that the Government is now working on a power plant to use the energy from the pile designed to make fissionable material and to operate at high temperature.

The only official data released to date on the probable cost of power from atomic energy is contained in a report to Mr. Baruch by a committee headed by Dr. Charles A. Thomas of the Monsanto Chemical Company. It stated that a 75,000-kw plant to use atomic energy would cost $25,000,000 compared to $10,000,000 for a coal-burning plant of the same size. Operated at 100 per cent load factor with interest on investment at 3 per cent and coal at $7.00 per ton, the committee estimated operating costs at 8 mills per kwhr for atomic energy and 6.5 mills for the coal-burning plant. These figures do not give a satisfactory comparison of costs to a utility man. No plant can be operated at 100 per cent load factor for long because of the need of repairs. The lower the load factor, the greater the disadvantage of the high-cost plant. Money for capital investment cannot be obtained at 3 per cent except at the expense of taxpayers. The low interest rate favors the high-cost plant. At present, the Buffalo Niagara Electric is building an 80,000-kw unit at Huntley which is expected to cost about $8,000,000 for the generating part of the plant. The cost of coal at Huntley is at present about $5.60 per ton. The Buffalo Niagara Electric sells power for general industrial purposes in the Niagara Frontier at a price which averages about 6.85 mills per kwhr. This price includes generation, transmission, distribution, and all other expenses. The load factor averages about 60 per cent. Even if Dr. Thomas' estimate for atomic energy be accepted, power which costs 8 mills for generation alone would not be attractive in this territory.

The Economic Effect of Low Cost Power

Dr. Thomas' report has been received by the press as indicating an imminent economic revolution in the world. This is doubtless due to an exaggerated idea of the value of power. The high standard of living in this country has been popularly attributed to the fact that we had put an average of 6 hp at the use of each industrial worker. The public generally overlooks the fact that the 6 hp represents an investment of less than $900 while the average investment in tools to use the power is well over $6,000 per worker. The development of trained experts, as well as of tools and processes, is responsible for our relatively high production per man hour to a far greater extent than the production of low cost power. Only a few industries, such as those using electric furnaces or electrolytic cells, find the cost of power an important element in their operations.

Niagara Falls has more industries of that nature than any other place in the world. It would be of a greater benefit to the Niagara Frontier than to any other section of the country if means could be found to produce power without limit as to quantity at 3 mills or less per kwhr. The Buffalo Niagara Electric Corporation is therefore greatly interested in the possible development of low cost atomic energy

The Problem of Radioactive Residues

There have been many unofficial reports and speeches made on the probable development of atomic energy Perhaps one of the best to date is the report of a committee which was published in the *Chemical Engineer* for October 1946. This report points out the fact that expensive controls for protection against radioactivity will be necessary and that they will cost nearly as much for a small plant as for a large one From this it is deduced that the economic size of plant must be 500,000 kw or more.

The report also discusses in some detail the problem of disposing of radioactive by-products and suggests two methods: One is to dump the stuff in the ocean at great depth. There are relatively few sites where this could be done. It would not be practicable around the North Sea, the report states, because the water is not deep enough to prevent such disposal from destroying the fish industry. The second is to drive deep wells, deep enough so that the products dumped in them would not contaminate underground water supplies. It is evident that, aside from present estimated high cost, the use of atomic energy will be greatly limited until the scientists develop a method of eliminating or of controlling the radioactive by-products.

Under present conditions, it appears that the one field which offers great economic advantages for the use of atomic energy is that of supplying power for naval vessels. If atomic energy can be adapted to that use it will eliminate, with great saving in cost, the need for tankers, oil farms, and other facilities now needed to supply fuel to the Navy. It will also revolutionize the use of submarine vessels. To a lesser extent, it may benefit the Merchant Marine. The Navy, being a part of the Federal Government, will doubtless be able to operate under the Atomic Energy Act.

After all, the development of atomic energy is in its infancy and we may confidently look forward to further developments of tremendous importance. Many of our laboratories are being equipped with cyclatrons, betatrons, and syncratrons of tremendous power, which are to be used for further exploration of the atom and of cosmic rays. Some scientists believe that much of the heat of the sun is generated by a complicated process that converts hydrogen into helium.

Uses for Atomic Energy

It is not impossible that some process may be discovered of releasing atomic energy by combining atoms at the lower end of the scale without producing radioactive isotopes. Already people are speculating on what such a process, freed

(*Continued on page* 432)

Advertising and Top Management

By Charles J. Allen

President, Public Utilities Advertising Association, and Vice-President, The Connecticut Light & Power Co.

Delivered before General Sales Conference, Southeastern Electric Exchange, Atlanta, Ga., Nov. 8, 1946

MOST poor advertising today is the result of the president of the store taking an interest in advertising and wanting to help.

Right here I'd like to announce in a loud tone clearly audible in Waterbury, Conn., that I never said anything like that. I'm quoting from an article written by Bernice FitzGibbon, then, and I fondly trust still, Advertising Director of Gimbel's in New York City.

Me—I'm a lucky guy. The president of The Connecticut Light and Power Company will tell you at the fall of a Stetson that he thinks the preparation of advertising, annual reports, publicity and related material is a job for the specialist and that he's a general practitioner. He's one of those top executives who isn't afflicted with pencil itch when you hand him a piece of copy. All I know, therefore, about executive interference with advertising comes second and third hand and it probably ain't so at all. But I must confess I've heard plenty of testimony from what should be authoritative sources.

Story of the Frustrated Copywriter

A few years ago I attended an advertising convention where the principal speaker was programmed to discuss the ambitious subject—How To Write Good Advertising. He was a nationally known utility advertising manager and a leader in his field. Just before his talk, however, he dallied more than momentarily at the cocktail bar and reached his place at the table at complete peace with all the world, slightly dishevelled and free, entirely free, of all inhibitions. Introduced by the toastmaster, he tossed the copy of his speech on the table and said—"Never mind this wonderful talk I have here, I'm going to tell you how advertising is really written. Some months ago I decided to get out a real ad for a change and I did. Honestly, I was proud of the smooth flowing copy, the striking head and the—if I do say so—excellent art work. There's an ad, sez I to myself, there's an ad. But I've learned never to let my aged enthusiasm run away with my early developed sense of how-to-stay-on-the-payroll. So before I showed it to the Boss I thought I'd better let some of our company executives take a look at it, just to be safe—you know.

"Now in our company the Vice-President in Charge of Rates is a pretty important fellow so I brought it in to him. 'That's a darn good ad, Fred', he said, 'but you haven't said anything about our excellent rates. You realize, of course, they are largely responsible for our fine public relations.' 'Sure enough', I answered, 'I don't know how I came to overlook that. I'll fix it right up, Mr. Whiffenpoof.' So I went back to my office, and took out one of my beautiful paragraphs and wrote in the story of our excellent rates.

"But I wasn't in the clear yet. The Vice-President in Charge of People pulls a heavy oar in our company boat, so I figured I'd better show it to him. 'A fine ad, Fred,' he said, 'but you haven't said anything about our relations with our employees. I don't have to tell you, I'm sure, Fred, that good employee relations are the foundations of our business.' 'You're entirely right, Mr. Smorltork', sez I, 'I'm sorry I overlooked that. I'll certainly fix that right away.' Well, that wasn't easy because one of our unions was just then threatening to strike, but I wrote up a good paragraph, if I do say so, and found a place for it. Of course that made it necessary to take out another of my own lovely paragraphs but I remembered that life was just a compromise, after all.

"I'd just about finished when the Vice-President in Charge of Salvage dropped in. 'Whatcha got there, Fred', he asked. 'This, Mr. McGillicuddy', I answered, 'is the best piece of institutional copy I ever got out. I think it strikes a brand new note and'll get good reading.' 'D'ya mind if I look at it, Fred', he asked. So he did. 'Well now, Fred', he said, 'this is a swell ad, one of the best I've ever seen, but I don't see where you've said anything about our Salvage Campaign. Did you read that memo I sent out last week to all the department heads telling them how much we'd saved in the last six months by our own Company Salvage Plan? You know, Fred, I always say if you watch the pennies the dollars will take care of themselves. Don't you think that ad should tell the salvage story?' 'I think you're quite right, Mr. McGillicuddy', I told him. So I added another paragraph and that made it necessary, of course, to take out another of my wonderful paragraphs.

The Unhappy Ending

"Well, I rewrote what was left of my original copy, rearranged the material and started down the corridor to tell our Art Man he'd have to think up another illustration and switch around the layout a little, when I ran into the Vice-President in Charge of Salvage. He's a hearty, jovial fellow and he stopped me to inquire, 'Well, what are you guys in the Hooey department working on now. Another prize-winner?' So I showed him my emasculated masterpiece. 'That's a darn good ad, Fred', he said. 'Would you like to get some constructive criticism? I don't know a darn thing about advertising but I can't help noticing that you haven't said a word about our excellent relations with the plumbers. I know I don't have to tell you, Fred, that the foundations of our business rest on our community relations and if we can't get along with the dealers and the plumbers and folks like that who sit next to us at Rotary, we're sunk.' Well, I was sort of tired out by that time so I said—'Thanks, Mr. Whottentot, you're so right. That's a real constructive suggestion.' So that new paragraph went in and out came the last of my lovely paragraphs. Then I showed it to the Boss and he OK'd it and we ran the ad—the same darn ad we've been running for the last 10 years—and everybody was happy but me."

What's Wrong Where

By this time it might begin to appear that there's nothing wrong with advertising that couldn't be cured by shooting the numerous vice-presidents who prowl around the business world harassing advertising genius with helpful pencils. But nothing could be less true. I don't know that there's much wrong with advertising but if it is not as helpful or as close

to top management as it should be then I believe that is not the fault of management, but of the advertising man himself.

What I am about to say is on the assumption that the advertising man knows his business, and what is of equal importance, that he *knows* that he knows it. Neither you nor I need be told that unfortunately this isn't always the case.

Of course if your management doesn't have a good advertising manager—whatever his title may be—whether he be company employee or agency man, then it can't expect to produce good advertising. It's unimportant whether he came out of the accounting, or engineering or sales departments, or whether he's always been in advertising—he must know his business. If he can't do a good job he should be promptly replaced by someone who can. If an agency can do the job better—all factors considered—then it should get the assignment. But the situation should be faced squarely and honestly. The functions of advertising are far too important to permit their appraisal on the basis of personal sympathy.

Admen at the Council Tables

Advertising and public relations are now edging into a favored position at the council table of industry. Their true importance is being recognized. In many companies in our field this hasn't been true in the past, and in some situations it isn't true now. We utility advertising and public relations men owe it to our industry and to our profession to see to it, so far as we can do so, that failure to earn a place at the company council table is not due to our own shortcomings. And in listing such shortcomings there should be included any undue shrinking from properly presenting and publicizing our own activities.

Top management should know what its advertising and public relations department is doing and—equally important—what it plans to do, and it is our duty to see to it that they do. Samuel Ferguson, president of The Hartford Electric Light Company, and one of America's leaders in developing sound public relations, recently said in an address given at a meeting of the Public Utilities Advertising Association at Hartford that Advertising and Public Relations representatives had earned their place at the council table, and Mr. Ferguson added that if management did not call them in then it was their duty to insist on being heard.

Advertise Advertising

It has been one of my observations in watching advertising movements that the heads of the utility advertising and public relations departments fall far short in this important requirement of telling top management what they're doing and what they plan to do by contrast with their friendly agency competitors. The good advertising agencies all recognize the pressing importance of telling their story and it must be conceded that if the question of whether they or the company advertising department should get the job were to be decided on this alone then the agencies would win practically all bouts on a knockout. Their competent contact men are complete masters of the art of Approach, and I rarely listen to an advertising presentation by one of these capable gentlemen without having the other important phases of his proposed plan completely submerged in my awe at his magnificent job of presentation.

I know more than one unprepossessing advertising man—don't look at me, Joe—but I have yet to see an agency contact man who wasn't a personally attractive, charming individual, momentarily lending on his pleasant visits to my drab office a man-of-the-world atmosphere that I could only expect to have achieved by a simultaneous visitation of Cary Grant, Grover Whalen and the Managing Editor of the *New Yorker*. Although my acquaintance with him up to then may be either nonexistent, or at best something less than sketchy, he casually mentions having seen this and that one of my friends who want to be remembered to me, quotes a witty line or two from a long forgotten speech made by me at a three-year-old advertising convention, and beams benevolently as he tells me that he wants to personally congratulate me on having won third prize in the recent Y.M.C.A. advertising contest in Naugatuck, Conn.

What Makes Good Presentation

But all this is just the prologue. Helping me push to one side the morning's mail to make room for the inevitable folding easel which he extracts from his beautiful all-leather bag, he launches into his presentation. And then I have the privilege of seeing how a competent, well trained individual does something so well that you and I, in common with many advertising men, do so badly—telling his own story to the man who can approve or reject his Plan.

One of the most important requirements of a successful advertising manager, and a *must* for linking Advertising effectively with Top Management, is the mastering of the Art of Presentation, that magic formula for convincing your Boss that your Plan is a good one and that you have the what-it-takes to put it into execution.

No one who has had the opportunity to see the high-grade advertising agency function in this important field can have anything but admiration for what they observe. Those of you who participate—and I hope you all do—in the National Electric Advertising activity, and who have watched the Ayer Company representatives guiding the activities of both the Copy and the Management groups, will agree that regardless of your own particular contribution to the meetings—and that may well be worthwhile—you are indebted to the Ayer organization for a job of presentation and performance, both equally well done.

You will not, therefore, misunderstand when I say that both Top Management and Advertising Managers have many times much to learn from the competent, well equipped agency in the Art of Presentation. Utility top management must, as it usually is, be accessible to the Advertising and Public Relations manager, and if it is not then it is the duty of the latter to do everything reasonably possible to have the door opened to him. But once open he himself must have the what-it-takes to tell his own story convincingly and well.

No Place for Blushing Modesty

At the same PUAA gathering at which Mr. Ferguson made the remarks I have already quoted, C. L. Campbell, president of my own company, and himself, if I may immodestly say so, a leader in the Public Relations field, came into the meeting a little later and made substantially the same comments that Mr. Ferguson had delivered earlier. Mr. Campbell, who as you all probably know is nothing if not delightfully forthright in what he has to say, said that advertising people are often too polite and modest for their own and their company's good. I have every confidence that he wasn't thinking of me when he said this because I'm more than reasonably certain that I have a poor batting average in the Shrinking Violets' league. But even extroverts like myself are often strangely deficient in telling their im-

portant Advertising and Public Relations story to busy Top Management.

Speaking of the Shrinking Violets' league reminds me to mention one aspect of this problem which may be partly responsible for the unwillingness or inability of Advertising men to tell their story properly to their own Top Management. Those of you in this group, and I suspect they are many, who have ever done newspaper work or handled publicity for any company or institution don't have to be told how large the don't-use-my-name group is. There is a feeling on the part of many really fine people that some sort of social error has been committed if their name ever appears in the vulgar public prints. Refusal to permit the mention of their name is, strangely enough, apparently considered by them to be prima facie evidence of sterling character, earnest endeavor and high resolve. Some carry this crusade so far as to issue orders that they're not to be mentioned in employee magazines or house organs, or anywhere else without their personal O.K. The Advertising and Public Relations man observing this strange quirk in what are ordinarily regarded as important people, may be pardoned if, having been exposed to more than his share of this sort of high character testimony, he becomes a little sensitive himself lest too oft made references to his department and its activities result in his acquiring the reputation of having a poor batting average in the Shrinking Violets' league in which so many of the best people are performing so nobly.

Voice of the Company

That's where he commits a serious blunder because his own department is often the one which most needs to have its story told, not alone to Top Management so that they may see the highlights of both what's going on and what's planned, but to the important trinity of employees, stockholders and customers, so they will hear at first hand the voice of the company. Public relations—and advertising, of course, is an important part of public relations—is the voice of industry, and its function is to tell not only the story of the company but likewise to insure that each of the three members of the Triangle of Industry—employees, stockholders and customers—know those phases of the business which more directly concern them, and are also made sympathetically aware of the problems of the other two sides of their triangle.

A recent industrial survey disclosed that the gulf between the front office and the shop workers is one of the important factors in creating industrial strife. Memorandums put on bulletin boards, couched in legalistic jargon and pedantically superior wordage invite unfriendliness, suspicion and distrust. Unless he is told it may not occur to the busy supervisor who originates and signs the notice that he has no special aptitude for that sort of thing and that he might well ask the Public Relations or Advering people to look it over.

Stockholder's Reports—Trend to Better Public Relations

I wish time permitted mention of the many directions in which Top Management's difficult job can be made easier by the aid of competently administered Advertising and Public Relations departments. I'll just mention one field which more and more is getting from management the attention its importance justifies—Stockholders' Reports. Those of you who are familiar with the grand job done by the *Financial World* in its yearly Annual Report Contests need no words of mine to help you understand how interested Top Management is in this important activity. Attending the Award Dinner held in New York a few weeks ago I was pleasantly amazed by the large attendance of industrial executives at or near the very top of the ladder in America's Hall of Industry. I am told that over 3000 Stockholders' Reports were originally entered in the contest. From this huge mass of printed material submitted in this year's Financial World Contest 1500 reports were selected for judging in the survey.

These reports were classified as Modern, Improved in the last 10 years and Unchanged in 10 years. It is highly encouraging that 581 annual reports were classified as Modern, as compared with only 16—mind you, just 16—in the *Financial World's* first survey in 1940. Reports classified as Unchanged are now only 28 per cent of the total—an amazing commentary on the progress made during the past five years when you recall that in the 1940 competition about 78 per cent of the Reports had not changed materially in the previous 10 years. It is noteworthy that in this year's contest the reports of 107 corporations were promoted from the Improved division to the Modern. Most significant, however, is the fact that 118 new names appear on the Modern roster this year—names that hadn't even qualified for the Improved classification in other years.

There's no doubt about it—Top Management has given the go sign to their advertising and public relations staffs. Nowadays it's the exceptional company which produces a report that isn't attractive and easy to read.

And while I've mentioned only Stockholders' Reports both Employee and Customer Reports are in the same category. Top Management indeed recognizes the need and the importance of telling its story and it is up to Advertising and Public Relations people to see to it that we do our part in telling not alone the story of our own utility industry but that of American industry as well, the story of free opportunity for all.

Tell Joe Gaspipe

Much of that story remains to be told and the need for telling it is demanding. A recent authoritative poll indicates that Joe Gaspipe believes that the annual profit of the automobile industry is about 25 per cent and that he accordingly considers the industry is unfair in such profit making. Automobile profits—when there are any—run from 4 to 8 per cent, one-sixth to one-third of what Joe believes them to be. More and more today the group opposed to the free opportunity system of America are expressing their vocal and written dissatisfaction with what they glibly call the high profits of industry. Polls indicate that a large percentage of otherwise well-informed people actually believe that American industry—and that includes ours—makes huge profits. You'll do a real service for your country and your company if you undertake to tell the facts. Advertising people should not be afraid to discuss controversial issues. So long as Joe Gaspipe hears only the pro side of the T. V. A. discussion he's for that. But if you tell him the other side he may weigh both in his mind and arrive eventually at a fair conclusion.

If, in some cases, either or both Top Management or Advertising house themselves in an isolated, insulated ivory tower then let's you and I do what we can to bring them down to the level of the common denominator human who first made it possible for them to erect the ivory tower. Industrial leaders—and that of course includes utility executives—are often pictured in the public awareness as fat, rosy cheeked, successful looking men who wouldn't hesitate to burn their mothers at the stake if that was

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Fatal Accidents in 1945

By D. C. Stewart
Chairman, Edison Electric Institute Accident Prevention Committee

TWO years ago in 1944 the industry's fatality rate, after fluctuating for several years within narrow limits, dipped to an all time low. It was the earnest hope of everyone interested in accident prevention in the electric light and power industry that this break through on the downward side marked the beginning of a decline which would carry the accident fatality rate to new permanently low levels. Consequently, when the 1945 experience became available it was eagerly scanned for evidence of a continuing favorable trend.

Results were disappointing. The fatality rate jumped from 0.43 lives lost per 1,000 employees in 1944, to 0.53 lives lost per 1,000 employees in 1945, an increase of 23 per cent. A summary of the record over the 5 years for which classifications and analyses have been made by the Accident Prevention Committee is given in the table below. It will be noted that the 1945 rate is the second worst of the 5 year period, being exceeded only by that of 1943.

FATAL ACCIDENTS PER 1,000 EMPLOYEES IN THE ELECTRIC LIGHT AND POWER INDUSTRY

Year	*Fatality Rate*
1941	0.50
1942	0.51
1943	0.55
1944	0.43
1945	0.53

The classification summary adjoining shows that the proportion of accidents in 1945 by types and by work locations adhered closely to the pattern established during the preceding four years. There appear to be no clues in this summary to reasons for the increase.

Moreover, the description of the 116 fatal accidents bring to light little that is new. If we exclude those few accidents which apparently could not have been reasonably prevented, there are few indeed remaining which do not have a prototype in some previously listed accident which was caused by the same unsafe work practice or the same unsafe condition. Billions of manhours of experience over this 5 year period have proved that history does repeat itself, not once but over and over again.

Special attention has been directed in previous articles to specific safe practices which would have prevented most of the accidents in that group which has produced 7 out of every 10 of all fatal accidents, namely the electric shock and burn group. Yet these accidents keep right on occurring year after year in about the same proportion and from the same causes.

There is both discouragement and hope in the situation; discouragement because of the persistency with which these accidents have been repeated from year to year in the face of increased knowledge of their causes and cures; and hope because out of all this experience better tools for accident prevention have been fashioned and are at hand if we will but use them. What is needed to get them into everyday use?

There is a quotation which can be paraphrased as follows:

"When one of these falls down he falls for those behind him, a caution against the stumbling stone. Yes, and he falls for those ahead of him who, though faster and surer of foot, yet removed not the stumbling stone."

Accident prevention is a many sided activity and one of the important factors, in prevention is undoubtedly observation by individuals of the mishaps that injure fellow workmen, and avoidance of the same "stumbling stones." But individual horizons are limited, unsafe work habits are strong, memories are short, and a program which rests upon no surer base is bound to result in tragedy.

It is in the second part of the quotation that we find the key to the most

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CLASSIFICATION OF FATAL ACCIDENTS OCCURRING WITHIN THE ELECTRIC LIGHT AND POWER INDUSTRY, 1941 TO 1945

Accident Type	Location	1945 No.	1945 Per Cent	1941-44 Per Cent
Electric Shock or Burn	Line work on poles	43	37.1	39.9
	Line work on ground	4	3.4	7.5
	Line work in trees	1	0.9	1.1
	At stations, on equipment	28	24.1	20.6
	Cable work, underground	2	1.7	0.5
	Other miscellaneous	1	0.9	1.6
	Total	79	68.1	71.2
Falls	Line work, poles or ladders	8	6.9	5.4
	Line work in trees	2	1.7	0.7
	Steam plants	3	2.6	3.2
	Hydro plants	0	0	0.5
	Substations	0	0	0.9
	Other miscellaneous	1	0.9	0.7
	Total	14	12.1	11.4
Motor Vehicles	Highways	3	2.6	3.6
	Railway crossings	0	0	1.8
	Other miscellaneous	3	2.6	0.7
	Total	6	5.2	6.1
Struck by Objects	Power plants	2	1.7	2.3
	Line work	1	0.9	2.7
	Other miscellaneous	2	1.7	0.2
	Total	5	4.3	5.2
	All other types and locations	12	10.3	6.1
	Total Accidents Classified	116	100.0%	100.0% 441

REVIEW AND CLASSIFICATION OF 116 FATAL ACCIDENTS REPORTED DURING *1945* WITHIN THE ELECTRIC LIGHT AND POWER INDUSTRY

Edison Electric Institute—Accident Prevention Committee

(This Summary was compiled from detailed reports submitted to the Institute)

ELECTRIC SHOCK OR BURN 68.1%	LINE WORK ON POLES	CONTACTS ESTABLISHED WHILE CLIMBING OR IN WORKING POSITION BUT WITHOUT CUTTING OUT OR LOSING BALANCE	HANDS	Volts-2300	Lineman	1.Converting 1 phase line to 3 phase. Opened grd. wire connector. Trans. backfeed
				2300	Lineman	2.Boring hole in pole. Bit contacted 2300 line. Leg against secondary.
				2300	Lineman	3.Changing transformer. Changing position, placed hand on capacitor terminal.
				2300	Lineman	4.About to chisel pole gain. Chisel caught. Freed it and unthinkingly hung it on pri.
				2800 -4800	Lineman	5.Investigating trouble. Trans. case hot. Touched hanger plate of trans.
				4000	Foreman	6.Building rural extension. Hand struck wire while placing safety.
				6900	Serviceman	7.Refusing trans. Hand on guy. Removing safety pulled jumper into guy.
				7200 -12,000	Lineman	8.Removing 12 kv hot line clamps. Reached up, touched 12 kv jumper.
				7600 -13,000	Foreman	9.Placing safety. Touched floating neutral, alive due to 2 fuses blown.
				7500 -13,200	Foreman	10.Changing trans. Reached for safety snap, touched 13.2 kv fuse.
				8000 -13,800	Lineman	11.Hot line work. Grasped hot stick near end hanging on live wire.
				12,600-22,000	Lineman	12.Hot line work. Climbing down, reached and contacted 22 kv wire.
				44,000	Lineman	13.Hot line work. Changing insulators. Placed hand on insulator cradle
				44,000	Lineman	14.Hot line work. Touched guy, alive, tie wire to arm brace to guy wire.
			HEAD OR BODY	110 -220	Lineman	15.Repairing st. lt. wire. Head contacted secondary. Fell from pole.
				DC 220	Lineman	16.Transferring sec. wires. Contacted live parts of comealongs on sec's.
				1280 -2200	Lineman	17.Disconnecting capacitor from line. Climbing, head struck fuse disconnect.
				2300	Lineman	18.Investigating trouble. Climbing, contacted energized hanging wire end.
				2400	Lineman	19.Changing transformer. Head contacted pri. tap. Leg on secondary.
				2300 -4000	Lineman	20.Cutting jumper with bolt cutters. Cutter slipped, handle touched head.
				4000	Lineman	21.Climbing over sec. wires, shoulder contacted 4 kv wire, 2 ft. above sec. rack.
				2300 -4000	Lineman	22.Replacing current trans. Passing safety, shoulder contacted trans. leads.
				2400 -4160	Tr'bleman-Lineman	23."Pole on fire." Shoulder contacted arm brace alive due to trans. failure.
				2400 -4160	Lineman	24.Disconnecting jumpers from wires. Head struck against 4160 wire.
				2300 -4160	Lineman	25.Refusing cutout. Head touched unnoticed dangling wire from cutout.
				12,500	Serviceman	26.Refusing cutouts. Climbing on trans. rack, head touched cutout switch.
				7600 -13,200	Lineman	27.Working 1 phase hot, 1 dead. Opened wrong (live) cutout. Contacted it.
			ARMS	2200	Troubleman	28.Jumper burned in two. Coiled it. Reaching for safety contacted coil.
				2300	Serviceman	29.Making connection to cutout. Reaching for knife, contacted wire end.
				2300	Lineman	30.Unserving primary dead end. Contacted bare spot where jumper had been.
				2300	Lineman	31.Changing crossarm. Reached over pri., contacted exposed part.
				1350 -2300	Lineman	32.Serving wire to make up dead end, contacted bare strand of pri.
				2300	Troubleman	33.Climbed to observe work on st. lt. switch. Contacted sw. lead near shoulder.
				2300 -4000	Lineman	34.About to descend. Reached for brace bit on arm. Contacted line wire.
				2300 -4000	Lineman	35.Checking insulators. Above conductors. Forearm contacted pri. wire.
				2400 -4160	Lineman	36.Replacing pole. Changing position to drive brace bolt. Contacted pri. wire.
				2720 -4800	Lineman	37.Tying in bare #2 wire. Contacted wire with upper arm while lifting it.
				7620 -13,000	Lineman	38.Climbing to disconnect service wire. Contacted transformer lead.
				St.Lt.Circuit	St.Lt. Inspector	39.Tying up hanging st. lamp (bracket broken). Contacted lamp terminal.
			LEG	4000	Troubleman	40.Opening metering trans. cabinet. Leg contacted phase wire of 4 kv bus.
		SLIP		6900 -11,000	Lineman	41.Checking 33 kv insulator. Slipped and fell on uncovered 11 kv line.
		CUTOUT		2300 -4000	Lineman	42.After removing gloves, reclimbed to remove handline. Cutout, fell on pri. wire.
		BK'KR EXPLOSION		4000	Lineman	43.Opened pole top breaker by hand. Breaker exploded throwing oil. Burned.
	LINE WORK ON GROUND	SETTING POLE		2300	Lineman	44.Setting poles. A-frame of truck contacted line. Grasped winch line.
		STRINGING WIRE		6900 -12,000	Lineman	45.Stringing wire below 12 kv. Grasped wire, fell. Wire touched 11 kv in next span.
		BROKEN TEL. LINE		"Static"	Laborer	46.Broken telephone line on "Hi-line" towers. Touched tel. line on bushes.
		DIGGING POLE HOLE		Not stated	Lineman	47.Digging pole hole. Digging bar struck energized underground cable.
	LINE WORK IN TREE			6900	Forester	48.Instructed to work from 12 ft. ladder. Climbed from ladder to tree. Contacted wire.
	LINE WORK ON LADDER			1350 -2400	Foreman	49.Repairing st. lt. hoisting cable from ladder. Contacted energized st. lamp hood.
	CABLEWORK, UNDERGROUND			2400 -4000	Cable Splicer	50.Pri. oil breaker in vault exploded when closed on faulty trans. Burned.
				2780 -4800	Cable Splicer	51.Removing friction tape binding temporary V.C. tape on cable connection. Shocked.
	WORKING AT STATIONS	ENERGIZED BUSES		11,000	Electrician	52.Arc from bus in adjacent cell entered cell in which men worked.
				11,000	Electrician	53.Same as 52. This was a double fatality accident.
		ENERGIZED LEADS, RISERS AND CABLES		7600 -13,200	Laborer	55.Removing [illegible] jumper. Arm contacted jumper.
				12,800-22,000	Electrician	57.Moving faulted trans. Bushing stud touched lead energizing tank.
				15,000-26,000	Operator	58.Painting breaker. Climbed on housing, grasped lead at top of bushing.
				33,000	Service Repive	59.Climbed on 26 kv breaker. Reason unknown. Contacted lead to breaker.

	CABLEWORK, UNDERGROUND		2400 -4000	Cable Splicer	50.Pfft. Oil breaker. Explosion. Contacted lead. Shocked.
			2780 -4800	Cable Splicer	51.Removing friction tape binding temporary V.C. tape on cable connection. Shocked.
	WORKING AT STATIONS ON OR AROUND EQUIPMENT BUS STRUCTURES ETC.	ENERGIZED BUSES	11,000	Electrician	52.Arc from bus in adjacent cell entered cell in which men worked.
			11,000	Electrician	53.Same as 52. This was a double fatality accident.
			[illegible]	[illegible]	54.Painting cell of substation [illegible]. Brush contacted open bus terminal.
			[illegible]	[illegible]	55.Painting cell of substation [illegible]. Brush contacted open bus terminal.
		ENERGIZED LEADS, RISERS AND CABLES	7600 -13,200	Laborer	56.Removing 13 kv jumper. Arm contacted jumper.
			12,800-22,000	Electrician	57.Moving faulted trans. Bushing stud touched lead energizing tank.
			15,000-26,000	Operator	58.Painting breaker. Climbed on housing, grasped lead at top of bushing.
			33,000	Service Rep've.	59.Climbed on 26 kv breaker. Reason unknown. Contacted lead to breaker.
					60.Changing fuse clips. Climbed up to get to next fuse. Contacted lt. arr. lead.
		DISCONNECTING SWITCHES	440	Electrician	61.Closing 3 pole 440 switch. Insulation broke leading to short circuit.
			2300	Elect'ns Helper	62.Turning steel I beam to paint it. Beam struck by-pass switch.
			4000	Electrician	63.Installing regulators. Standing on step ladder, contacted disconnect.
			2780 -4800	Elec. Mechanic	64.Wiping insulators on trans. Contacted nearby disconnects.
			8000 -13,800	Operator	65.Faulty oil breaker failed to break circuit. Opened disconnects loaded.
			8000 -13,800	Electrician	66.Same as 65. This was a double fatality accident.
			8000 -13,800	Operator	67.Applying phasing current to line. Leads contacted adjacent live disc's.
			14,500-25,000	Electrician	68.Cleaning disconnects and greasing leads. Applied file to energized disc.
			33,000	Lineman	69.Changing insulators on air break sw. Alive due to failure of sw. 5 mi. away.
			66,000	Foreman	70.Servicing bus disconnects. Removed door (red tagged) contacted switch.
			Not stated	Operator	71.Blocking breaker. Opened disconnect, contacting frame of lower compartment doors.
		CURRENT TRANS. LIGHTNING ARR.	Not stated	Electrician	72.Testing meters. Short circuit jumpers on current trans. loosened. Shocked.
			33,000	Substa. Cleaner	73.Raking leaves inside L.A. enclosure. Contacted arrester. Burned.
		CIRCUIT BREAKERS	2300 -4000	Mechanic	74.Adjusting control contact block in breaker compartment. Touched terminal.
			24,000	Laborer	75.Checking breaker operation. Climbed to 2nd breaker before clearance was made.
			44,000	Elec. Mechanic	76.Wiping bushings on grounded side of breaker. Backed into energized bushing.
		11 KV EQUIPMENT	11,000	Lineman	77.Putting in fuses on substa. Contacted live part of station.
		33 KV EQUIPMENT	33,000	Elec. Mechanic	78.Installing asbestos lumber barrier below 33 kv apparatus. Made contact.
		EQUIPMENT	Not stated	Sub-Foreman	79.Testing dead end strain and pillar insulators. Turned into live section. Shocked.
FALLS 12.1%	LINE WORK ON POLES	FALLING POLE		Lineman	80.Transferring wires. Pulling slack on 2 st. lt. wires when pole fell.
		FALLING POLE		Lineman	81.Removing H-frame from creek bank. Removing crossarm, pole fell.
		FALLING POLE		Troubleman	82.On ladder pulling guy attached to steel guy pole. Guy pole fell.
		TOWER LADDER		Lineman	83.Riding tower ladder on truck. Ladder struck guy wire. Fell to street.
		GAFF CUTOUT		Serviceman	84.Descending pole. Cut out and fell 22 ft. to ground.
		MISPLACED CLIMBER		Lineman	85.Descending pole. Caught gaff in other pant leg. Fell 30 ft.
		LOST HAND HOLD ON POLE		Lineman	86.Unbuckled safety preparatory to descending. Lost hold on pole. Fell.
		SAFETY SNAP		Lineman	87.Snapped safety snap into handles of pliers instead of D-ring. Fell 44 ft.
	IN TREES	BROKEN BRANCH		Lineman	88.Working wire through trees. Branch broke. Fell 15 ft. to ground.
		BROKEN LIMB		Tree Man	89.Trimming for line clearance. Climbing. Limb broke. Fell 35 ft.
	STEAM PLANT	COPING HOOK		Painter	90.Washing windows from scaffold. Coping hook came off. Fell.
		PLATFORM		Welder	91.Handing up tubes from platform. Near top of boiler. Slipped and fell 50 ft.
		SKYLIGHT		Car Cleaner	92.Cleaning boiler room monitor gutters. Fell through skylight.
	BLDG.	PARAPET WALL		Mechanic	93.Installing new aerial post. Standing on corner of parapet. Fell 135 ft.
STRUCK BY OBJECTS 4.3%	POWER PLANT	FIRE WALL		Fireman	94.Moving bricks from fire wall. Center fire brick wall fell. Crushed.
		GUARD'S SHANTY		Guard	95.Strong gust of wind blew guard's shanty over, pinning him underneath.
	LINE	ROLLING POLE		Line Foreman	96.A 55 ft. gin pole was loaded on flat truck. Rolled from truck striking man.
	RR	MOVING TRAIN		Cable Man	97.Entered RR rt. of way, going for drinking water. Struck by train.
	BLDG.	STEEL SHEETS		Mechanic	98.Blocking under leaning steel sheets. Sheets tipped over, striking man.
MOTOR VEHICLES 5.2%	HIGHWAY	INTERSECTION COLLISION		Field Operator	99.Tractor truck skidded into intersection, jack-knifed, struck company car.
		COLLISION OF VEHICLES		Field Operator	100.Oncoming truck struck men loading tools. Pinned them between trucks.
		TRUCK OVERTURNED		Laborer	101.Avoiding collision, driver left road. Truck overturned. Thrown ag. tree.
	FIELD	CLETRAC TRACTOR		Boiler Repair'n	102.Moving timbers. Tractor overturned on sloping edge of roadway.
		CATERPILLAR TRACTOR		Rigger	103.Pulling stubs on R.O.W. Riding over clump of thornapple bushes, overturned.
	PLANT	COAL TRUCK		Eng'g. Aide	104.Checking coal truck deliveries at barge loading dock. Run over by truck.
BURNED 3.4%	STEAM PLANT	HOT WATER		Mechanic	105.Connecting water sample line. Nearby expansion joint failed. Scalded.
		STEAM		Crane Operator	106.Operator allowed young fireman to dump ashes. Crane upset, steam line broke.
		STEAM		Fireman	107.Same as 106. This was a double fatality accident.
		FIRE BOX EXPLOSION		Boiler Oper'r.	108.Lighting high pressure boiler. Explosion occurred within fire box.
CAUGHT IN OR BETWEEN	STEAM PLANT	RAILROAD CAR		Hoist'g. Eng'r.	109.Walking by moving car. Caught bet. car and concrete pillar at curve.
		RAILROAD CAR		Crane Operator	110.Walked with car to uncouple it. Caught between car and building.
		RAILROAD CAR		Crane Operator	111.Attempted to climb moving car. Fell between two moving cars.
DROWNED 2.6%	PLANT	BARGE		Dredge Oiler	112.Operating crank on hand winch. Handle struck him. Fell from barge.
		BARGE		Laborer	113.Unloading barge. Bucket picked up plank. It swung. Knocked him overboard.
		BARGE		Laborer	114.Pushing boat from barge with pole. Pole slipped. He fell in river.
STRUCK AGAINST	PLANT	IN CONDENSER		Yard Man	115.Cleaning tubes in condenser. Raised up, struck head. Fracture.
	SUBSTA.	TIMBER BEAM		Foreman	116.Walked into substa. Bumped leg on timber on floor. Infection developed.

Compiled for the Edison Electric Institute
Accident Prevention Committee
by D. C. Stewart, October 1946

Advertising and Top Management

(*Continued from page* 414)

the only way they could light their cigar. Tell Joe Gaspipe the truth—tell him that your executives are men much like Joe himself, interested in their families, their friends, their hobbies and their communities, and you will at the same time be selling your company as a friendly neighbor to Joe. Put yourself and your company on Joe's level where you can talk to each other and work together for the good of your community.

Advertising—Management Team

When something goes wrong with your service explain it to Joe. If you're really good you can make a virtue of your own shortcomings or bad luck. One of the most striking proofs of how good advertising can do a job was given by the A. T. & T. during the war. That astutely managed company used a considerable portion of its advertising space to inform its customers that the service it was giving was poor and to explain why superior service was impossible and service of any kind subject to unforeseeable delays and stoppages. It extensively employed every media to explain operating and personnel problems. As an indication of the degree of public understanding it has reached, the company found that it had more applications for new service six months after V-J day than it had at the end of the war, and that complaints from the public were less than 25 per cent prewar. How is that for making a virtue of necessity? And how, I ask you in loudly admiring tones, is that for demonstrating completely what can be done when Top Management and Advertising go to work hand in hand.

People, as Ed Howe said, are smart. If they learn from sources they trust and believe, from friends and neighbors who are employees, from objective newspapers, from impartial observers that the policies of our company violate the accepted standards of fairness and ethics, then no amount of printing, advertising or publicity releases will raise that company in their esteem. Actions *do* speak louder than words but words with actions are the most efficient and potent means of public relations communication.

Words and Actions

It's up to us as advertising and public relations men to help Top Management with the tools with which the advertising department is presumably best equipped—the use of words. Not the legalistic jargon of the dry-as-dust court room, not the florid lingo of the look-at-all-the big-words-I-know school, not the pedantic wordage too often exalted in the class room as being in the best English tradition, but the language that Joe Gaspipe understands even though the grammar and syntax may be a little more orthodox but not necessarily any the less colorful than Joe's everyday speech.

On many situations, the Advertising or Public Relations Manager is definitely listed on the Management level in the organization chart. This isn't necessarily a matter of title; he may have a high sounding designation or none at all without placing him within or keeping him without the management council. It is simply a question of just how useful the Advertising Man is permitted to be and permits himself to be to Top Management. The opportunities are as limitless as can be. Competent Top Management is continually searching for aid in doing a better job. And it is widely alert to the continuing need of convincing America that free enterprise—I still like that expression even though it's taken a bad beating in the dull and decrepit institutional advertising which some of us have inflicted on Joe Gaspipe—must continue to be the driving influence behind any progress in this country.

Wider Aspects for Advertising

We need, all of us, to keep constantly in mind that we're selling more than appliances, more than kilowatt hours, more even than our companies. We're selling a way of life that has provided for Americans a higher standard of living than any known in the whole jumbled history of this planet. But we have among us those—a minority but a highly vocal one—who would discard that system and substitute regimentation, controls and any one of a number of current "isms." A great American once said: "The God who gave us life gave us liberty at the same time." His name was Thomas Jefferson.

We can't be spectators. If those opposed to our way of life were to succeed we'd lose more than our companies to a rash of TVA's and MVA's—we'd lose our precious liberties. Management is looking to us to tell the story of the American system of free opportunity. We'd better get busy, right now, each of us in his own area and remind the folks of the dangerous propaganda they're exposed to every day of their lives by trained, skillful practitioners of the black art. If we're not on the job with everything we've got, we may wake up some day and find out we're too late.

Fatal Accidents of 1945

(*Continued from page* 415)

effective accident prevention work. No one can study these fatal accidents without realizing that many workmen have lost their lives "for those ahead who, though faster and surer of foot, yet removed not the stumbling stone."

Removal of "stumbling stones" which may cause injury to others is something in which everyone can and should participate, workmen, supervisors and top management alike, but staff men, supervisors and managements have a unique responsibility. Anything short of complete acceptance and faithful discharge of that responsibility has led and will lead to the heartaches, suffering and loss that accompany accidents.

Perhaps in the light of the 1945 record, it is time for all of us to make an objective appraisal of our part in the effort.

Are we safety men? Then let us ask ourselves: have we done a good job in uncovering the causes and cures of accidents, arranging them in order of importance, and presenting the results in such a way as to secure action? Have we been diligent enough in discovering unsafe work practices or conditions and causing them to be corrected?

Are we engineers? Have we checked our plans and designs to insure that no hazard will be built into the plant through some omission of ours?

Are we executives or supervisors? Have we accepted fully and are we doing all that we can about the ultimate and inescapable responsibility that is ours to see that safe practices are followed and unsafe conditions corrected in our organization?

Some have blazed the trail and have shown it can be done. Their testimony leaves no doubt as to the worthwhileness of the effort. Recently the chief executive of one utility company, after reviewing a quarter century of accident-prevention effort which has established his company in a position of leadership in the industry, concluded his remarks with this statement:

"I know of no other single activity in our company which has returned so much for so little."

House Heating by the Heat Pump Method

By S. W. Andrews

Rate Engineer, American Gas and Electric Service Corporation, New York, New York

From an address presented at the Eleventh Annual Conference, I. A. E. L., New York, N. Y., Oct. 2, 1946.

THE heat pump has been receiving more and more public notice during the last few months. It is a subject with which my company has been concerned in one way or another for fifteen years. It is a subject in which the more we learn the more enthusiastic we become, notwithstanding the fact that our progress turns up various difficulties as we go along from day to day.

First I should like to tell you why my organization is interested and enthusiastic about the heat pump. Our business is 100 per cent electric utility business. We have an active sales organization in all our subsidiary companies and we have for many years promoted the use of electric energy by all of our customers as actively as we know how. We take some satisfaction in having increased our sales per domestic customer by 140 per cent since 1930 while we were at the same time adding about 300,000 customers. We used to take some satisfaction in our 20 per cent range saturation and our 5 per cent water-heater saturation. But as we get back into the business of growing, of trying to lick the problems of increased costs by increased profitable sales of electric energy, we are much more apt to look at the 80 per cent of unsold ranges and the 95 per cent of unsold water heaters and the many other markets available in the domestic, commercial and industrial fields. Everywhere we look we find our business becoming more and more competitive, and the competition becoming more and more aggressive. We have our work cut out for us.

In much of the territory where our companies operate, in parts of Indiana, Ohio, West Virginia, Virginia and Kentucky, we are in competition with natural gas. Over 50 per cent of our customers live in communities where natural gas is available and natural gas rates vary from 30 cents to 60 cents per thousand cubic feet for 1,100-Btu gas. In the remainder of the communities, we have competition with artificial gas and, in suburban and rural territory away from gas lines, there is growing competition from bottled gas.

As we look at our domestic market, and this holds to some extent also for the commercial market, we find that the toughest single problem facing us is house heating. We have had a number of instances recently where housing developments have been constructed involving small, modern two and three bedroom houses, where the house heating is to be done with gas. In many of these cases, the promoters have also included gas cooking, gas water heating, and even gas refrigeration. We find it is difficult to sell electric appliances where gas is being sold for house heating and where, therefore, additional gas use comes at the low blocks on the rate.

The Competitive Field in House Heating

To meet this competition we would like to be able to offer electric house heating to our customers at installation costs comparable to other forms of automatic house heating and at operating costs comparable to fuels. Then we will not only open up new markets for ourselves in the form of the heating load itself, but we will go a long way toward the installation of electric appliances of all sorts.

We have studied the possibility of electric house heating by resistance-type space heaters. As you know, this is most difficult of accomplishment on any really economic basis.

When you start with generating plant efficiencies of no better than about 35 per cent, add the line losses between the generating plant and customers' premises, add also the fixed charges and operating costs on distribution system and perhaps new generating equipment which go with demands in the order of 2 kw per room (or maybe more in this part of the country) and annual load factors of perhaps 10 per cent to 20 per cent, it doesn't look to us as though we can compete with fuels. We made some calculations a few weeks ago on a housing project in one of the southern communities we serve and the estimated annual cost to the customer came out between two and three times the estimated cost with fuels. And so we are convinced we have to look for something else. And we turn to the heat pump as being the one device now in prospect which seems to hold out the possibility, or rather I think we can say probability that the electric utility industry can really go after the house heating business.

Fundamental Operation of the Heat Pump

There seems to be a good deal of mystery about just what the heat pump is and how it operates. Basically, it is simply the very familiar electric refrigerator. What an electric refrigerator actually does is to take heat out of the inside of the cabinet, which is a place of comparatively low temperature, and release the heat in the room, which is a place of comparatively high temperature. In the ordinary electric refrigerator, we are interested particularly in the cooling effect in the inside of the cabinet and we never even consider the heating effect in the outside room. If, however, we change our interest, if we are interested in heating rather than cooling, and devote our attention to the heat which is liberated by the refrigeration machine rather than to the cooling effect, it has become customary to speak of the unit as a heat pump rather than a refrigerator.

Where the heat pump is used for domestic heating, it takes the heat which is available outside of the house in a place of low temperature and it pumps that into the house and releases it at a higher temperature. A heat pump is ordinarily designed to operate on a reversible basis so that when you are heating you take heat from a low temperature source (air, water or ground) outside of the building and pump it into the building. The same unit can be reversed and operate as a cooling unit, in which case it takes the heat from the inside and pumps it to the outside.

In a way this sounds complicated. Certainly a refrigeration unit with its motor, its compressor, evaporator, condenser, piping, valves, etc., is not as simple as a conventional fuel-burning heating plant. But it is wonderfully efficient.

Coefficient of Performance

The amount of heat which can be transferred by a refrigeration machine or a heat pump from a place of low temperature to a place of higher temperature is several times the amount of heat

represented by the electric energy which operates the machine. The expression which describes this is the coefficient of performance. The coefficients of performance of heat pumps now available may run from three or four to one, depending on temperature conditions. This means that, as contrasted with space heating, the customer may need to buy only from one-quarter to one-third as many kilowatthours as he would for heating by space heating. It means likewise that the demand created by the customer may be only from one-quarter to one-third as great as it would be for a space-heating installation but, by virtue of the fact that the same unit can be operated for cooling in the summer time and heating in the winter, the annual load factor is increased and the costs of operating and carrying the utility's enhanced facilities can be spread out over the whole year.

In many parts of the country, utility men estimate that, with year-round heating and cooling the heat pump will give annual load factors of from 25 per cent to 35 per cent as compared to the lower load factors for heating alone.

From the customer's point of view: if you cut down the kilowatthours by three or four to one and hence cut down his annual cost of operation, you can see that electric house heating by the heat pump gets to a position where we can really begin to compete with house heating by fuels. That is why we are so interested in the heat pump and so enthusiastic about it, why we think it is so necessary, and why we think that you people like ourselves, will be interested in it. Surely, when the heat pump gets into full commercial production there is going to be a tremendous market for all of us.

Previous Experience with the Heat Pump

Our company has had actual experience with heat-pump installations for some twelve years. We have units installed in eight office buildings in different parts of our system. These units are, of course, larger than units which would be necessary for domestic purposes and they range in size from 15 hp to 50 hp. The first of these was installed in 1934-5 and the latest in 1946 (Tidd Plant). They were in each case systems employing conventional motors and compressors, evaporators, and condensers, and also using conventional refrigerants. During the period that these have been installed, they have been the only heating equipment which has been used in these offices. They have given satisfactory service on both the heating and cooling cycles. They have convinced us that heating and cooling by a heat pump is practical and workable.

However, as was to be expected, there have been changes which we have made in them from time to time. The units are, as I said, all installed in offices where our own service men are available and the units have had to be serviced. They are not the type of units which could be put in the homes of residential customers because they are not as efficient and not as trouble-free as that type of service demands or as, we are sure, can be manufactured.

Plans for Postwar Production

Therefore, we prepared specifications for domestic heat pumps in the early spring and we sent these out to a number of manufacturers for their comments. At the same time, we sent the proposed specifications out to a great number of utility companies throughout the country asking them for their comments. We thought that, if we could now point out to the manufacturers the type of performance that we were looking for and could back this up by orders from utility companies for a substantial number of units, perhaps we could get the ball rolling.

We have now had individual talks with most of the manufacturers to whom we sent the specifications. We have in most cases found a great deal of interest and in some cases enthusiasm. There have been other manufacturers, however, who have said that, because of their pressing problems in getting into the manufacture of their standard products, they could not do anything about the heat pump at the present time.

We have had two general meetings with utility companies, in which we had a very full and frank discussion of the heat pump from the point of view of both its commercial problems and possibilities and also from its technical and design point of view. The first meeting was held in New York on June 20 and 21 and was attended largely by representatives of utilities located in the eastern part of the country and the Middle West. The second meeting was held in Birmingham, Alabama, on August 5 and 6 and was attended by utility men from the South, the Southeast and the Southwest.

The discussion, both with the manufacturers individually and with the utility men in groups, have been very fruitful and as a result of these discussions we have revised the specifications and the revised specifications have now been sent out to the manufacturers and to the utility companies.

I should like to tell you briefly some of the general features which are described in the specifications as they now stand and to describe briefly some of our thinking and some of the thinking of other utility men and the manufacturers which has led to the development of the specifications.

Manufacturing Specifications

The specifications call for the manufacture of a total of 1,000 units, consisting of 600 units operating on an air-to-air basis and 400 units operating on a water-to-air basis. Air-to-air, as you know, means taking heat from the outside air and releasing that in an air heating system in the house. A water-to-air unit takes heat from water on the outside of the house, such as well water or city water and releases that in an air heating system in the house.

In our preliminary specifications of last spring, we called for five different types of units including, in addition to these two types, a water-to-water and an air-to-water unit, and one in which a storage tank was included to act as a booster during extremely severe weather conditions. Our discussions with both the manufacturers and the utility companies brought out the point that, while these other types of units would unquestionably have future application, the program at this stage could be advanced and results could be secured more quickly if the number of units covered by the specifications was reduced to two.

In our discussion with utility men at New York there was a great deal of interest in the taking of heat from the ground. We have not included in the specifications a separate unit for this type of operation, but it is of course apparent that a water-to-air can readily be converted to a ground-to-air unit by the use of a different type of coil to take the heat from the outside.

All the units will have 3 hp, single-phase motors. This may seem at first to be a rather small unit, but we believe that this unit will be entirely capable of heating small two and three-bedroom houses, built with good insulation, which is the type of house we find to be under construction at the present time throughout the country. After some of the 3-hp jobs have been built and the manufacturers have had experience with

them, it would seem that larger units, or two-stage units, could be developed comparatively easily.

Basic Qualities Specified

I will not attempt to describe all the technical matters that are listed in the specifications, but there are six basic qualities which we have asked for:

a. High reliability
b. Economical performance
c. Reasonable first cost
d. Low operating cost. The unit must be highly efficient and subject to inherently low maintenance cost.
e. Compactness—it must be possible to get the unit through conventional doorways.
f. Neat appearance.

What we have in mind is a heat pump with a hermetically-sealed compressor unit and a factory-sealed refrigerant circuit which will operate with about the same trouble-free performance and the same quietness as the conventional domestic refrigerator of good design. It seems to us that, if the manufacturers can build machines as well as they do for domestic refrigeration purposes involving fractional horsepower motors, they can design the same type of machine for the larger size of 3 hp. None of the manufacturers seriously disputed his ability to do this.

The specifications ask for performance which is better than the performance presently achieved from those units now on the market. The manufacturers, however, do not doubt their ability to meet the performance requirements. In specifying performance, we have to deal with specific conditions. You cannot ask a manufacturer to give you an over-all average coefficient of performance of, let us say, three to one, or four to one, or some other figure, because the performance of the unit, as you know, is very definitely fixed by the temperature conditions under which the machine operates.

Specifications for Air-to-Air Unit

For the air-to-air unit, the specifications call for a total kilowatt input, including compressor, fans, and all auxiliaries, not to exceed 4.2 kw and for a heat output of 48,000 Btu per hour at 10°-F outdoor temperature, 70°-F indoor temperature, and a 100°-F temperature in the air which is circulated through the house. Under these conditions the coefficient of performance is 3.35.

The performance of a refrigeration machine improves as the temperature spread between the incoming and outgoing sides of the machine is decreased. This means that when the outside temperature is higher than 10° F the working pressure of the machine will be reduced and the coefficient of performance will be greater. Conversely, if the outside temperature goes below 10° F, the working pressure is increased, thereby reducing the coefficient of performance. This presents one of the difficulties in heating by the heat pump when using air as a heat source, because the unit does become less efficient the colder the outside temperature becomes and the greater the heating requirements are. This means, of course, that in the actual installation of units the greatest care will have to be exercised to see that proper installation is made to meet the conditions called for in any particular house.

The manufacturer is asked in the specifications not only to meet the performance standards for 10°-F outside temperature, but also to tell us the heating capacity, total kilowatt input, and coefficient of performance for outdoor temperatures of zero, 10, 20, 30, 40, and 50° F.

Water-to-Air Unit Specifications

In the case of the water-to-air unit, such experience as we have had in our own office buildings indicates that ground water temperatures, even as far north as central Ohio, remain in the range of 40 to 50° F throughout the year. Therefore, the performance requirements for the water-to-air unit are based on a water temperature of 50° F and again 70°-F inside temperature and 100°-F temperature for the air which is circulated in the house. The total kilowatt input is limited to 4 kw, including compressor, conditioner fan, and water pump. The unit is to deliver 62,000 Btu per hour and under these conditions to have a coefficient of performance of 4.53. Here again we are asking the manufacturer to tell us what the unit will do with water temperatures of both 40 and 50° F.

Air or Water?

With the inherent characteristic of the refrigeration cycle that for any given inside temperature the machine is more efficient the higher the temperature of the heat source, a great many people believe that in the northern part of the country perhaps only the water-to-air heating units would have application. It is unquestionably true that at some point as we go farther north we will find this to be the case, but I think you might be interested to know that we have three air-to-air units in Ohio office buildings, one in Portsmouth and two in the vicinity of Steubenville. Steubenville is in about the same latitude as Philadelphia. The two units which have been in service through a complete heating season have proved completely adequate for heating even under the most adverse conditions. The third is a brand new installation and will operate during the coming season. We naturally hope that there will be some air-to-air units installed further north so that we can find out what they will do under actual conditions.

The air-to-air unit is bigger in size, because it has to have two large coils for exchanging heat between the air and the refrigerant, but is simpler because it needs only a connection to the outside air, the inside duct system, and the electrical connection. It does not have the capacity at times of low outdoor temperature as does the water-to-air unit where the water temperature stays around 40 to 50° F. The water-to-air unit is smaller because the coil transferring heat from the water to the refrigerant is smaller than the one transferring the heat from air to the refrigerant, but in the water-to-air unit you have to find a source of water, which usually means either increased first cost if you dig a well, or increased operating costs if you buy circulating water from the water company.

Automatic Operation

Another thing that we have in mind in the specifications is that the units shall be completely automatic. They will switch over from heating to cooling automatically. Especially in the South and the Southwest where they frequently have cool nights and hot days we visualize the automatic operation of the machine on the heating cycle during the early morning and evening hours and on the cooling cycle in the middle of the day.

The specifications also provide for the incorporation of a dehumidifier so that inside air in the house can be properly dried during hot, damp weather. This was stressed by utility men from the Southeast, especially those on the seacoast where humidity presents a very important problem.

Production Problems

Our original thought was that, if we could get orders for 1,000 units, then the manufacturers, or some of them at least, would go right to work on the problem. We do not yet have orders

from utility companies for that many units, although we expect more orders now that the revised specifications have been sent out; therefore, in sending the specifications to the manufacturers we have asked them, first of all, to submit a proposal at their earliest convenience for the designing and fabrication of one pilot model of each type of unit. It is our thought that, if it is necessary for us to contribute toward the building of pilot units, we ought to give consideration to this if it will advance the timing of the program. It appears from our discussions with the manufacturers that it is going to take pretty nearly two years from the time they go to work on the problem until they can begin to turn out units from the production line. This being the case, it seems to us very urgent that they get to work promptly so that we will begin to get units no later than the 1948-49 heating season. The specifications call for quotations from the manufacturers, complete with the information requested, not later than June 1, 1947, and, of course, the manufacturer cannot provide this until he has built his first pilot models and had some experience with them. The specifications further provide that acceptance of the proposal will be made by the purchaser not later than August 1, 1947, and that starting July 1, 1948, at least 25 units shall be shipped each week until the order is completed.

The specifications, with the request that immediate proposal be made by the manufacturers with reference to pi ot units, have been sent to seven manufacturers, who have indicated interest in the program.

In our discussions with utility people and others, many people have been disturbed at the long period which must of necessity elapse before units built to our specifications are ready. "What," they ask, "is the story about units which are presently available and which will perhaps become available in the near future?"

Existing Heat Pump Manufacturers

We know of three manufacturers actively engaged in the heat-pump business. Perhaps there are others. Drayer-Hanson of Los Angeles now makes air-to-air units which have been installed largely in commercial establishments in California. They are now in the production of 3, 5, 7½, and 10-hp units. Their production schedule for the year 1946 calls for 2,000 units and in 1947 they expect to produce 5,000 units. A number of their units have been in service for a year or more. We understand they are now engaged in setting up distributors or dealers in parts of the country outside of California and there will no doubt be a more widespread distribution of their product.

Muncie Gear Works of Muncie, Indiana, makes a water-to-air unit and they have some installations around Muncie. Their unit was initially designed for the heating cycle only, but we understand that their subsequent units will include the cooling cycle as well as the heating. They have built relatively few units this year, but they have built some and are building more. In their system, instead of pumping water out of a well and then discharging the water after it has given up its heat to the unit, they use a closed system where they circulate water between the unit and the well. This closed system of circulating water eliminates the operating cost which would go with purchasing water, it reduces pumping costs as compared to using an open well, and it eliminates also problems of having a well run dry, or the problem of lowering the water table, which conceivably could occur if many units were pumping water out of the ground in the same neighborhood. However, a 200-ft well such as they recommended may be a costly proposition for approximately 10 gallons of water per minute.

Production of Earth Heat Pumps

The Terra-Temp Company of Indianapolis has one installation of a custom-built job which takes heat directly from the ground by laying refrigerant coils in the ground itself. The Terra-Temp Company, we understand, has been delayed in getting into production and, so far as we know, no units are as yet available.

In our utility meetings where this unit was discussed, there were grave questions raised as to the servicing problems on this type of unit. It seems to some of us, at least, that servicing is bound to be a whole lot easier and more satisfactory to the customer if we have a unit in which the refrigerant circuit is sealed in the factory rather than one in which the refrigerant flows through an extended tube system which lies from two to five feet below the surface of the customer's yard.

All three of these units work. They do a heating job. The Drayer-Hanson unit does both a heating and cooling job. They are not as efficient as units that will be built to our specifications. We feel that the type of unit which the utility industry and the dealer need, to go after the field of automatic house heating, must be of the best. In other words, it must be specifically designed to do its job from the point of view of performance and service. Whether you conclude to participate in the program of the present manufacturers or not, we are sure that you will be interested, as we are, in getting on with the program which we have under way.

Initial Cost Estimates

You are all, no doubt, tremendously interested in knowing what these units might cost to buy and to operate. We do not as yet have any firm first cost figures from manufacturers because they have, of course, just begun the study of the final specifications. In October, 1945, Drayer-Hanson did quote us a price of $1,250 for a 3-hp unit of their present air-to-air design. Muncie has talked to us about a figure of $2,100 for some initial units, which price, we understand, includes a large portion of the development costs and is not necessarily indicative of final costs at full production. Whether a 3-hp unit eventually winds up $800 or $1,000 or $1,200, it seems reasonably certain that the cost will be less than the combined cost of a fuel-fired heating system and a separate air conditioning system.

From the customer's point of view, we think that with expected efficiencies heat pump operation at our standard regular rates should, in most cases, be entirely competitive with heating by fuels. From our company's point of view, we think that with expected demands, kilowatthour consumptions, and load factors we can afford to sell energy for heat pump operations at our standard rates. Therefore, we think that we have no particular rate problem and we believe that many, if not most, other utilities will find themselves in the same position.

As I have said previously, the specifications contemplate the utility industry ordering 1,000 units. My own company, with about 3 per cent of residential customers of the country, plans to take 50 units or 5 per cent of the initial 1,000. You are, no doubt, tremendously interested in how and where and under what conditions these units might be installed and what part the dealers might have in the program. That, we judge, is something which will have to be worked out in each community in the light of local conditions, and in the light of local poli-

cies and practices applicable to the sale of all sorts and kinds of electrical appliances and equipment. In any event, we are confident that, once the performance and efficiency of the heat pump are demonstrated to the public and units begin to come in quantity from a number of manufacturers, there will be plenty of room for all of us in the program. In connection with the first 1,000 units, however, it is our plan, no matter what the conditions are under which installations are made, to work out a uniform basis of testing the units in service so that the results obtained in different parts of the country can be correlated and we can all learn from the initial installations how best to approach the sales and installation problem which will have to be met.

Water Heating by the Heat Pump

When you begin to think about the heat pump and its very efficient operation in delivering heat where you want it, the thought will probably occur to you, couldn't this be used for water heating? Last spring, when we drew up our initial specifications, we incorporated in them a small condenser unit which could be used for heating household water. As we went into the matter further, however, we realized that the requirements for hot water and the requirements for household heating and cooling would not necessarily occur simultaneously and that by including the water heating in the main system we might be introducing unnecessary complications. Therefore, we concluded that we had better treat water heating as a separate subject.

A heat-pump water heater has many attractive commercial possibilities.

If we could have a heat-pump water heater with a coefficient of performance of three or four or more to one, we ought to be able to exploit some of this market which we have not been able to really go after heretofore. Accordingly, we developed this spring specifications for a heat-pump water heater. These also were sent out to manufacturers and have been discussed with them and at our utility meetings in both New York and Birmingham. Some of the utility people felt that there was even more promise in the heat-pump water heater than in the household cooling and heating job. Over and over again the thought was brought out, could we not combine a water heater with, let us say, a refrigerator, or deep-freeze unit, both operated by the same refrigeration mechanism? Could we not in some way make use of the cooling effect which would go along with a unit designed primarily for heating water?

There appear to be many attractive combination possibilities which might well be explored. But when we came to the end of the discussions, again, the general opinion seemed to be, let us do first things first—let us develop a water heater, get the bugs out of that, and then later we can go on and start to explore combinations.

Heat-Pump Water Heater Specifications

The water heater specifications, which have gone out to the same manufacturers as for the household heating and cooling job, provide for a single air-to-water design. We have asked for 10,000 heat-pump water heaters broken down into 6,000 50-gallon heaters which will have 1/3-hp motors, 3,000 80-gallon heaters which will have ½-hp motors, and 1,000 110-gallon heaters which will have ¾-hp motors. The performance which is asked for, based on 50°-F air temperature at the cooling surface, 50°-F incoming water temperature, and 140°-F water temperature in the tank is 5,850 Btu per hour for the 50-gallon tank, 8,750 Btu per hour for the 80-gallon tank, and 13,000 Btu per hour for the 110-gallon tank. The coefficient of performance for these conditions is about 4.5. Again we are asking the manufacturers to tell us what the unit will do at air temperatures of 40, 50, and 60° F and at water temperatures of 130, 140, and 150° F.

If we consider the heat output of these machines, I think you will find that it compares very favorably with the heat output of conventional resistance-type heaters and they should adequately meet the customers' requirements for hot water.

The water heater is to be built as a single unit so that it can be moved in and placed in operation by simply connecting the water lines and the electric service. Attention is given to quietness of operation, neat appearance, etc. The motors specified are single-phase, suitable for operation on either 120 or 240 volts and are to be capacitor-type motors to obtain the highest power factor and efficiency. Our discussions with manufacturers indicate that heat-pump water heaters, because they are smaller than the household heating and cooling unit and in many ways like existing domestic refrigerators, can be offered commercially in 1947, or approximately a year before the house heating and cooling units will be available on a commercial basis. The specifications call for quotations complete with all information by January 1, 1947, acceptance of the proposal to be made by the purchaser by March 1, 1947, and starting of delivery of at least 250 units a week by September 1, 1947.

Cost Estimate for Water Heaters

While we do not have any quotations on the cost of these, it is probable that they will cost the customer about $100 more than a resistance heater of the same tank size. As production increases, it may well be that this differential can be reduced. Commercially, we will have the problem of balancing the increased first cost against the lower operating cost and, if we find ways to utilize the cooling effect to the customer's advantage, this also will have its part in the commercial consideration of the matter.

That briefly is our program and where it stands now. We have no interest in any particular heat pump or any patents. Our only interest is to participate with the rest of the electric industry in developing these units which we firmly believe will meet some of the most pressing problems facing the industry today. The more and more people, whether they be manufacturers, utility men, dealers, research men, or others, who get interested in the problem, work on it, make installations, study the results of operating, exercise their good old American ingenuity on all the problems which present themselves, the sooner and the surer will the problem be licked, and we as an industry can get at the problem of bringing automatic electric heating and cooling to the people of this country.

Mutual Assistance Plan of Connecticut Electric Utilities & New England Telephone Company

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will be advised to avoid making statements which might be taken as criticisms of the other company's accomplishments.

This plan is now in operation, assignment of personnel has been made, maps have been prepared and patrol areas assigned. Patrol reports have been printed and are packaged with individual maps ready to be handed out to the patrol men. The lists are up to date and the yearly review of the entire plan has been made with the Telephone Company within the past two months.

Planned Lighting Program for the Electric Industry Sponsored by Edison Electric Institute

AN industry-wide Planned Lighting Program, which will provide electric utility companies with the most comprehensive promotional and educational campaign ever aimed at increasing the use of better lighting in five major markets—residential, store, school, office and industrial—and which is based upon the practical knowledge and ideas of utility lighting men of long experience, has been authorized by the Board of Directors of the Edison Electric Institute, and announced by Grover C. Neff, President of the Institute.

The need for an intensive all-industry effort to sell lighting in these five markets was indicated by many individual electric companies, Mr. Neff said, and the program is sponsored by the Institute in answer to their requests. The Planned Lighting Program is expected to be ready for use in 1947.

The supplying of one complete program which the entire industry can use will eliminate much duplication and waste of effort, Mr. Neff declared. It will also help the electric company better to map its own lighting development plans, and to select promotional material that is especially suited to its needs.

A sales plan book, outlining suggested procedures, will be prepared for each of the five lighting markets mentioned above, and will be backed up by a complete line of promotional aids. The plan book for increasing sales of store lighting, for example, describes the characteristics of this market, the potential revenue to be secured by planned sales efforts, and the organization and methods best suited for successful selling in this market. It then represents a complete sales and promotional plan, indicating step by step, the methods which are recommended, and which have been proven successful in the field.

The supporting promotional and educational materials which will be furnished for each of the five markets, include presentations for use by salesmen in their customer contacts; direct mail pieces, booklets, posters, visualizers, films, newspaper advertising suggestions, and other aids when the need was indicated by experienced lighting men.

Emphasizing the importance of the lighting load to power company revenues, Mr. Neff pointed out that "Lighting is one service that is used by all. It has been and probably will continue to be the backbone of the industry. The lull in lighting promotion caused by the war has created a backlog in demand which now presents us with the greatest opportunity and market for development in lighting in the industry's history.

"The use of this Planned Lighting Program by any electric company will assure it of a well-rounded promotional and educational program, prepared by outstanding lighting men, and custom-tailored to the needs of the electric utility industry."

The lighting program is confidently expected to prove so successful, Mr. Neff said, that it will be continued from year to year. Suggestions from electric companies who use the program will be employed in its preparation in conjunction with an advertising agency experienced in the lighting field—which will keep the program constantly abreast of changing conditions.

Penelec Employee Service Award

A PROGRAM designed to help keep employees of the Pennsylvania Electric Company conscious of continually giving good customer service and also keeping up property appearance, reached its first milestone recently when the personnel of two districts were honored at dinner-meetings given in recognition of their placing highest for the first six-months period of a company-wide "Four Point Plan."

The Bradford district which placed first among nine districts held a dinner-meeting on Nov. 6; and the Oil City district, which was first for seven districts, held one on Nov. 7. The highlight of each meeting was the presenting of a trophy by D. W. Jardine, president of Penelec.

Penelec's "Four Point Plan" derives its name from the four points on which the districts are appraised: personal factors, customer satisfaction, appearance of property and favorable atmosphere. Each of these main points takes in several factors, such as courtesy, knowledge, cheerfulness, cleanliness, uniform practices, etc. Appraisals are made by twelve system employees whose regular duties take them to all districts of the Company. The appraisers rate each district twice in each six-months period.

Inaugurated last March, the program is expected to be continuous with results to be announced semi-annually. The trophies will remain in the possession of the high point districts until the end of the current six-months period.

Electric and Gas Industry ACCOUNTING CONFERENCE

Hotel Statler
Buffalo, N. Y.

April 7, 8 and 9,
1947

The 1947 Accounting Conference offers you the opportunity to hear the latest developments in accounting technique discussed by experts . . . to learn how the other fellow is solving problems similar to your own . . . to see the newest types of accounting and business machines in action.

Subjects to appear on the program will be carefully selected to cover major topics of interest to accountants and executives, and will be introduced by outstanding authorities. More details of the program will be published following a meeting of the Program Committee. which will be held in mid-January.

An extensive exhibit of the newest accounting and business machines is being arranged in connection with the Conference, and will also be located at the Statler.

In view of the chronic shortage of hotel space, it is urged that your reservation be made as soon as possible.

Mutual Assistance Plan of Connecticut Electric Utilities and New England Telephone Company

By W. A. Upham
The United Illuminating Company

An address before the Transmission and Distribution Committee at The Cavalier Hotel, Virginia Beach, Va., October 8, 1946

DURING the hectic days following the hurricanes of 1938 and 1944, utilities using overhead wire construction in the New England area made frantic efforts to replenish their stock of poles, crossarms, guy wire, guy clamps, connectors, etc., and also contacted every source of labor for clearing fallen trees and re-establishing their wire facilities. Linemen and laborers arrived from as far west as the Mississippi and as far south as Georgia by plane, trains and automobile. Trucks drove over the road with relief drivers so that no time was lost and crews caught snatches of sleep while under way.

As a result suppliers stocks were depleted, boarding and sleeping facilities were overcrowded and the utility getting the jump on his neighbor had his lines in service and was releasing men and supplies while the less foresighted were still struggling to get back in shape.

Facetious remarks were made to customers, "Well, we have your electric service back, but you'll be lucky if you get your telephone within a month." And vice versa.

All this did not foster the best intercompany feeling, nor did it result in the re-establishing of service to the greatest number of customers in the least possible time.

Realizing the seriousness of this situation, and in an endeavor to improve operations at some future time, a special committee was appointed by the Joint Committee on Plant Coordination of the Edison Electric Institute and the Bell System. This was known as the Joint Sub-Committee on Cooperation in Emergencies. It held its first meeting in February, 1945, in New York, with six representatives of electric companies and six from telephone companies present.

It was suggested that local committees be formed, within the territories of the several companies represented by the committee membership, to consider in detail the methods whereby the two industries could be of assistance to each other and to report to this committee the plans which they proposed to follow locally in this respect.

As a result, meetings were held at New Haven, Conn., by the general committee on March 21 and April 11, and there were numerous sub-committee meetings. As an outcome of these the following plan was evolved between the Electric Utilities of Connecticut and the Southern New England Telephone Company.

1. GENERAL

1.01 The general purpose of this plan is to provide for coordinated effort by the power and telephone companies in the restoration of their services after an emergency affecting a large number of customers of both. The ultimate object is to accomplish this restoration in as short a time as can reasonably be expected.

1.02 This plan is intended to apply to the several power companies separately with such modifications as to detailed application as may be necessary. Each power company's territory and the corresponding telephone company exchanges will be defined and indicated on a map to be prepared jointly by the two companies.

1.03 In communities where power company district or general headquarters are located, the telephone company will establish a district headquarters on an emergency basis where such a headquarters is not normally in operation. Normal organizations of both companies will be augmented as appropriate.

2. PREPARATORY MEASURES

2.01 Lists of key personnel are to be interchanged between companies. Details of these lists will include the general functions of each person included thereon together with office and home telephone numbers.

2.02 Each company will provide such maps as may be mutually agreed upon as of assistance in the emergency restoration activities outlined in this plan.

2.03 On the approach of an emergency of which advance warning is received, a designated individual of each company will communicate with the other to assure that both companies are cognizant of the danger and are prepared to set up any necessary mutual arrangements. At this time, if the situation appears sufficiently serious, each company will appoint a coordinator to perform functions of liaison as hereinafter provided in paragraph 3.12. Where no advance warning is received this contact will be made as soon as it is recognized that an emergency exists.

2.04 Lists of individual priority customers will be interchanged so that each company may know where the other may be expected to require immediate restoration of its service. Where it is felt that such information would be of value, power company lists will include a designation of those customers who are equipped with emergency standby service.

2.05 Information as to main feeder routes carried on jointly occupied poles will be interchanged in preparation for early joint action in restoration work on such plant if disarranged.

2.06 The plan is to be reviewed by both companies together at a prescribed time each year in order to make such changes as experience might indicate and to bring interchanged lists and data up to date.

3. RESTORATION ACTIVITIES

3.01 As quickly as possible after the occurrence of an emergency a survey of damage is to be made to obtain the number, magnitude and location of plant derangements, including poles broken or leaning, trees in plant, section of electric light wire down, sections of telephone open wire down, crossarms broken, cable damage and, where desired, service wires or drop wires damaged.

3.02 The survey will be made by employees of both companies working separately and not in the same areas. The information obtained will be entered by those making the survey upon organ-

ized forms which are to be designed to show the information required by each company. From these forms the information will be made available immediately to each company. The areas covered by the survey will be set up on maps provided under paragraph 2.02 of this plan. Where practicable these maps will include a tentative assignment of the area for survey as between companies, subject to such modification as may be required by conditions developing at the time of the emergency. Where no such assignment is practicable, assignment of the area as between companies will be made at the time of the emergency and will be based on conditions then known to exist.

3.03 Before starting the survey the employees selected to make it will be given simple and brief instructions as to what to report and how to post the forms. Where advance warning of the emergency is received, this may be done previous to the actual occurrence of the emergency.

3.04 Supplies used by both companies, particularly poles and guying materials will be interchanged as necessary. This will be arranged with the company furnishing the item in question through its coordinator.

3.05 Each company will inform the other if extra linemen qualified for its work are needed. In such case each company will refer to the other any "floating" linemen who may apply for employment who are best qualified for the other company's work.

3.06 Contract crews will be subject to interchange between companies. Generally this will not be necessary except in the case of tree contractors. In such case little interchange is to be expected in view of the fact that much of the tree work is on joint plant. It is assumed that each company maintains lists of tree contractors and municipal authorities who may be called upon for assistance under emergency conditions.

3.07 Where unusual numbers of workmen are to be housed in a community which may involve overcrowding, housing agents appointed by each company will cooperate to effect an equitable division of the available facilities.

3.08 Where expedient, because of the nature of the restoration problems, pole replacements will be made by either company regardless of custodianship.

3.09 Wherever tree trimming or removal work is done on joint plant generally the facilities of both companies will be cleared regardless of which company's crew is actually doing the work.

3.10 In caring for individual priority customers, each company will follow its own priority list. However, each company will so cooperate with the other as to facilitate early restoration to all priority customers of both. Where necessary, individual cases shall be handled through the coordinators.

3.11 Sequence of restoration by each company in so far as it affects the other will be arranged at the time of the emergency in accordance with conditions then existing. Special arrangements shall be made through the coordinators.

3.12 Immediately upon the development of an emergency requiring the operation of this plan, or in advance of such emergency if warning is received of its approach (see paragraph 2.03), each company will appoint an individual to act as a coordinator with the other. The qualifications of this individual will be as follows:

(a) He will be well grounded in outside plant problems of his own company and generally familiar with those of the other company.

(b) He will be familiar with the policies of both companies.

(c) He will be thoroughly acquainted with the territory common to both companies.

Where communications between different parts of the area covered by this plan are so disrupted as seriously to hamper coordination work, additional coordinators will be set up as required and will function until restoration of such communications permits the work to be centralized.

3.13 It will be the duty of the coordinators to serve as contact points to arrange for the prompt meeting of all situations requiring joint action so as to avoid unnecessary delays to either company's forces.

3.14 Each coordinator will be located within or convenient to the dispatching center of his own company. A telephone private line for direct connection between the coordinators will be installed and each will be provided with regular telephone service to the exchange or P.B.X. of his company. The telephone services will be provided by the telephone company immediately upon development of the emergency or before such development if sufficient prior warning is received.

4. ACCIDENT HAZARDS

4.01 In time of emergency, the power company will de-energize circuits known to be in dangerous condition, as learned from patrols, employees' reports or reports by authorized public agencies.

4.02 Both companies will use all possible means to warn the public against coming in contact with fallen wires of any kind.

4.03 Each company will advise the other of observed actual or potential property damage due to the other's plant.

4.04 The de-energizing of any power circuits or portions thereof to permit work to be done by telephone company personnel will be considered by the power company upon request of the telephone company. Decisions as to whether to de-energize such a circuit will be on the basis of the length and importance of the circuit and the possibility of some different method being employed whereby the work may be done safely with the power circuits being left energized. Power circuits de-energized under this provision will not be re-energized, until assurance is had that all telephone employees are in the clear.

4.05 Except as provided in the foregoing paragraph 4.04, power circuits which have been de-energized incident to the emergency either at substations or other points, will be re-energized only after it has been determined by actual patrol that such circuits are in safe condition. Questions as to whether or not a given circuit is energized and the answers thereto will be routed through the coordinators.

4.06 The telephone company in particular will continually emphasize to all employees the probable grave consequences of personal contact with power circuits, either directly or through crosses between power and telephone plant, and will warn them to use every precaution to avoid all possibility of such contact and to observe all safety requirements.

5. PUBLIC RELATIONS

5.01 In so far as possible, restoration of service will be synchronized between the two companies by areas or localities. The accomplishment of this will be one of the duties of the coordinators.

5.02 Each company will endeavor to keep its employees generally informed as to the other company's problems in order that they may answer inquiries regarding such matters intelligently and all

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Preston S. Arkwright

Preston Stanley Arkwright, chairman of the board of directors of the Georgia Power Company, died of pneumonia on December 2, at the Emory University Hospital, Atlanta, Georgia.

Mr. Arkwright held the presidency of the Georgia Power Company and its predecessors during four decades in this century—a record probably unmatched in the electric industry. Throughout his business career, he made substantial contributions to the progress of the electric power industry as a whole in the United States.

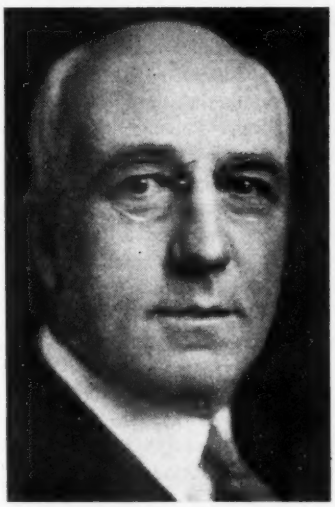
Born in Savannah County, Ga., on February 24, 1871, Mr. Arkwright was a descendant of Sir Richard Arkwright, the inventor of the spinning frame, and a pioneer in early industrial enterprises in 19th Century England. Mr. Arkwright's father, Thomas, came to Georgia as a machinist and millwright, and engaged in textile manufacturing.

Despite the mechanical aptitudes which he inherited, Mr. Arkwright studied law at the University of Georgia, from which he graduated in 1891. For ten years he practiced law in Georgia, and then became a vice-president of the Georgia Electric Light Company in 1901.

In the following year, Mr. Arkwright was elected President of the Georgia Railway and Electric Company. When the Georgia Railway and Power Company was organized in 1912, Mr. Arkwright became President of this organization, which acquired control of his former company. Another consolidation of some 20 public utilities in Georgia in 1927 resulted in the formation of the Georgia Power Company, and Mr. Arkwright became President of the consolidated company.

He continued in this position until 1945, when he was elected chairman of the board of directors of the Georgia Power Company.

Mr. Arkwright received national recognition in 1928, when he was elected President of the National Electric Light Association, for a one-year term. He also served on many committees of the NELA. From 1929 to 1931, Mr. Arkwright was the President of the Association of Edison Illuminating Companies. At other periods in his career, he acted as President of the Southern Gas Association, and also served as the representative of NELA with the United States Chamber of Commerce, the Electrical Manufacturers Council, the International Chamber of Commerce, and the National Industrial Conference Board.



PRESTON S. ARKWRIGHT

Mr. Arkwright was also President and a director of the Atlanta Northern Railway Company; President of the Savannah River Electric Company; a director of the Commonwealth & Southern Corporation of Delaware, and a director of the Commonwealth & Southern Corporation of New York.

He was a member of the Board of Trustees of Emory University, and also acted as President of the Salvation Army of Atlanta for many years.

Mr. Arkwright's basic creed was "Self Reliance," and he employed this rule in all his actions as a business man, as well as a citizen. Speaking at the University of Georgia in 1935, he defended his beliefs in individual self reliance as the basis of character, and described the then existing conditions in the following words:

"As matters now stand, we are half individualist and half collectivist, and the conflict between these two diametrically opposed theories is producing, and can produce, nothing but confusion—a confusion of cross purposes, which causes the country to halt and stumble along, back and fill, and veer from one side to the other. . . .

"The issue is whether the responsibility for the individual citizen's security shall be assumed by the government or by the individual citizen himself."

Establish Scholarships in Memory of War Dead

TO COMMEMORATE the 15 employes of the West Penn Companies who sacrificed their lives during World War II, the establishment of Memorial Scholarships has been announced by officials of the companies. These Memorial Scholarships are to be awarded to sons and daughters, and younger employes of the companies.

In the year 1947, a total of eight Memorial Scholarships will be available —two for one year, two for two years, two for three years, and two for four years, each providing $500 per year toward the cost of a college education.

Beginning with 1948, two Memorial Scholarships will be available annually, good for a period of four academic years. The selection of the recipients of these scholarships will be determined by competitive examinations conducted by a recognized impartial agency.

These Memorial Scholarships are open to two classes of applicants:

Class One includes sons or daughters of employes of West Penn Power Company or its affiliates—West Penn Railways, Allegheny Pittsburgh Coal, and Windsor Power House Coal—where the mother or father has been employed by the Company for a period of five years or more on May 1 of the year in which the scholarship is awarded.

In Class Two are junior employes who have been continuously employed by any of these Companies for at least two years prior to May 1 of the year in which the scholarship is awarded. Not more than one of the two scholarships will be awarded to this class in any one year.

Scholarships will be granted for a period of one year at a time, with payment being made at the rate of $250 per semester. The scholarship will be continued for four academic years, provided high academic and personal standards are maintained during the college course. Scholarships may be used in any accredited college approved by the Memorial Scholarship Committee.

Applications in 1947 for scholarships of less than four years may include those otherwise eligible who are already attending college. All applicants will take the same examination, and the longest-term scholarships will be granted to those making the highest score, unless such score is attained by applicants who have already completed part of a college course.

Accident Prevention Committee Meeting

D. C. Stewart, *Chairman*

THE thirty-third meeting of the EEI Accident Prevention Committee was held on October 31 and November 1 at the Statler Hotel, Buffalo, New York, with 60 members and guests in attendance.

Mr. E. J. Kreh reviewed the 1945 accident experience of the electric light and power industry covering 230 companies, and noted the following increases over 1944:

Number of lost time accidents per million manhours increased 11.4 per cent.

Number of days lost per thousand manhours increased 10.7 per cent.

Fatal accidents increased 41.5 per cent.

Man days lost increased 12.7 per cent.

Accident rates of the smaller companies are considerably higher than those of the larger companies. The accident frequency rate of electric utilities is slightly better than the average of all industries, while the severity rate is considerably worse than the average.

The Chairman presented the detailed report on the 116 fatalities during 1945 which completes a five year period of detailed fatality studies. 68 per cent of the cases were due to electric shock or burn which agrees with the average of about 70 per cent over the five year period. 43 fatalities occurred on poles. The complete fatality report is reproduced elsewhere in this issue.

During the second day's session there was a lengthy discussion of possible means of improving accident trends in the industry. The consensus of the Committee was expressed by C. B. Boulet who stated that some member companies consistently have accident records far below the average while others, having exactly the same techniques available, just as consistently have records far above the average. He stated that it is insufficient to merely cite accident records together with repeated statements that the safety records must be improved, but that it is necessary to provide concrete safety programs which include training to insure that the safety techniques available are understood and used, and to continuously reaffirm safety consciousness.

R. P. Douglas discussed the proposed survey of transformer-tank grounding practices throughout the country. The need for this survey has been indicated by the occurrence of several fatalities due to contact with ungrounded transformer cases which have become energized. The Committee voted unanimously to carry out the survey.

E. R. Paige demonstrated apparatus and models used for training in safety practices by the Western Division of the Niagara-Hudson System. There is always a need for a fresh method of presenting the subject of safety to operating personnel and the use of models and apparatus have proved to be an effective means. A virtue of this method is that the men feel freer to speak at the meeting since attention is centered on the apparatus rather than the man. Small scale models employed include a miniature lineman working in a primary area with provision for marking the paths of current through his body by means of tiny electric lights as he is subjected to shock in various ways, a truck-mounted derrick for demonstrating how the derrick may collapse with improper arrangement of the legs, a pole structure for demonstating the application of rubber protective equipment, a cable fault finder, a double bank of three single-phase transformers to show possible connections met in practice, a model for demonstrating the mechanical advantage gained by the use of blocks and ropes, a guyed pole structure for demonstrating the relation of forces encountered in guying by actual measurement and a model for demonstrating the phasing of conductors at a cable splice. Full scale apparatus includes a transformer pole structure, primary voltmeters, secondary voltage testers and disconnect switches for demonstrating the inching method of breaking an arc.

I. R. Dohr summarized current practices in the use of linemen's rubber gloves and sleeves among 117 companies. The curved finger, Type B, 14-inch glove is by far the most generally used. A test voltage of 10,000 volts applied for a duration of from 1 to 10 minutes is used by 75 per cent of the companies and the majority test gloves monthly. 75 per cent permit the use of gloves above 3,000 volts, phase-to-phase, on isolated neutral systems and only 29 per cent permit their use above 3,000 volts, phase-to-ground, on grounded neutral systems. With a single exception, all companies require the use of leather protectors. 21 glove failures were reported. 7 of these were mechanical failures resulting in two fatalities. Leather protectors were not used in one of these cases. 12 of the failures were electrical, resulting in one fatality. 53 per cent require linemen to put on gloves before reaching their working position. Only 8 per cent require the use of rubber sleeves which is reflected in the number of fatalities due to arm contacts reported by the Chairman. The 27 per cent allowing gloves to be worn inside out apparently are not aware of the fact that this weakens the gloves electrically. 90 per cent provide linemen with their own gloves and cases.

T. R. Claffy of the W. H. Salisbury Company reviewed the history of coating rubber gloves with Neoprene in an effort to reduce corona cutting. Initial testing continues to produce promising results; however, more definite appraisal of the value of this coating awaits the results of tests in other laboratories as well as the development of a more uniform test procedure suitable for reproduction in any laboratory.

C. B. Boulet presented a sound-slide film on station accidents entitled "Snake Eyes." This film was produced by the Wisconsin Public Service Corporation and is based on showing workmen safe, recommended procedures rather than being a factual record of specific accidents and their causes. Twenty-four distinct safety procedures are demonstrated.

A. L. Dowden of the Liberty Mutual Insurance Company presented a film entitled "Danger—High Voltage" which depicts cases of electric shock accidents to the public. The film is designed for showing to electric utility personnel to call attention to possible hazards associated with pole and tower steps, wire clearances and substation enclosures.

E. C. Rue reported completion of the final draft of Electric Lines Field Manual No. 1, entitled "The Use and Care of Pole Climbing Equipment" and the committee unanimously voted to authorize publication of the manual.

The Chairman read E. E. Beck's report on the training program survey. This study indicates that either specific or continuing employee training programs are effective in increasing safety and efficiency and that the first classification of employees to be trained should be those connected with line work. Such training may be either the conference or physical type, but should in either case

be allied closely to job analysis, job breakdown and work practices. All training programs for employees doing active work should stress artificial resuscitation and those for linemen should also include pole-top resuscitation. It is important that training programs for specific purposes such as safety and efficiency be followed up in order to insure that they are effective.

W. R. Smith summarized the preliminary results of a survey of work area identification practices and proposed that the desirability of standardizing working practices be considered at the next meeting of the Committee.

G. S. Diehl indicated the need for a standard proof test for tower ladders. He reported the purchase of 12 tower ladders 6 of which failed under an improvised load test. Four of the remainder were rejected because of excessive spiral grain slope. Two of the ladders which failed under the load test would have been accepted under the spiral grain test. Thus, neither of the tests would have eliminated all defective ladders.

The administrative organization of the Southern Division of the American Gas & Electric Service Corporation was described by D. C. Duncan.

A. J. Hill reported the discovery of sub-standard snaps being manufactured for linemen's safety straps. He also reported that the wartime use of webbing in lieu of leather for linemen's safety belts has been eminently satisfactory and that the continued use of webbing is planned. He suggested the preparation of standards for webbing for this purpose in the absence of any such existing standard.

G. S. Diehl presented a full color movie showing low voltage arcing short circuit tests which were staged to demonstrate to operating personnel the damage which can result from a low voltage short circuit.

E.E.I. Sponsors Research to Find Stimulant for Electric Shock Victims

ARTIFICIAL respiration and associated techniques of first aid for resuscitation of those whose normal breathing has been suspended by accident are especially important to electric light and power companies because of the vital necessity of life sustaining procedures being started as quickly as possible after an electric shock is received, which stops normal breathing. This need for reducing the time between the shock and the starting of artificial respiration was the consideration which prompted the study made some years ago by the Duquesne Light Company and which resulted in the development of Pole Top Resuscitation, a technique now quite generally a part of the training procedure in many electric utility companies. (See "Pole Top Resuscitation," EEI Publication K-8.)

The primary importance of these measures, which can be made effective without delay and through the use of the hands only, will perhaps never be lessened by any supplementing medical care by physicians. However, the experience in the industry has suggested that perhaps some of the fatalities from electric shock might have been prevented if there had been available to the doctors who responded to the emergency call some drug that could be administered through injection and which would give substantial aid to the respiratory center.

Over the years many doctors have felt compelled when called to attend victims of suspended respiration from carbon monoxide poisoning, drowning, or electric shock, to give hypodermic injections of some sort but, because of the ineffectiveness of available substances, this procedure has not been endorsed by those doctors and physiologists who have worked intimately with the operating companies and accident prevention groups in the electric light and power and gas industries. In the interest of these groups and at the invitation of the Committee on Safety of the American Institute of Electrical Engineers, Dr. Cecil K. Drinker, of the Department of Physiology, Harvard School of Public Health, presented on Jan. 23, 1945, in New York, a paper entitled "The Use of Drugs in Resuscitation from Electric Shock." (See *Electrical Engineering,* August, 1945, Vol. 64, No. 8, Pages 288-289, and *Journal of the American Medical Association,* June 30, 1945, Vol. 128, Pages 655 and 656. Also Minutes of 28th Meeting of EEI Accident Prevention Committee, Appendix 28A.)

Dr. Drinker summarizes his discussion of "drugs that can be shown by animal experimentation to stimulate breathing . . . what they do and where they fail," with the following statement—

"At the present time there is no substance which can be given by injection which benefits the breathing significantly. Caffeine and sodium benzoate intravenously may be useful but has no specific potency.

"In my opinion the Edison Electric Institute might do well to consider financing research looking toward the discovery of some substance which will be of substantial aid to the respiratory center, much as does caffeine, but really efficient. I do not think any agency so completely dependent on the attendance of a physician, as is an intravenous injection, can be of primary consequence in resuscitation from electric shock, but year by year we have instances of artificial respiration carried out for minutes to even many hours with eventual recovery. It must be clear to every one that the most our crews trained in artificial respiration accomplish during their period of effort is to substitute artificial breathing for absent natural breathing. They merely give the patient a chance to recover by arresting asphyxia. I believe more than this could be done in the direction of finding some direct aid to the respiratory center and that in such a direction we shall see our greatest advances in the resuscitation of the most serious electric accidents."

On the recommendation of the Accident Prevention Committee, the Board of Directors of the EEI has approved an appropriation for the carrying forward of research in this subject at The Johns Hopkins University in Baltimore as soon as arrangements can be made for necessary techniques and equipment. The research project will be under the direction of Dr. W. H. B. Kouwenhoven, Dean, Department of Electrical Engineering and W. R. Smith, sponsor for the subject of resuscitation in the Accident Prevention Committee, will serve in liaison capacity between the Institute and the University. The research is anticipated to require a year at least. Dr. Drinker's final words, quoted above, are encouraging and an inspiration to the Institute to make possible this investigation in the interest of the nation's electric light and power companies. Whereas there are no assurances at present with respect to what may be the results of the research it is hoped that something may come out of it which will be a valuable second line of defence against fatality from electric shock.—*W. R. Smith.*

PERSONALS

TOWSEND H. SOREN, vice president of Hartford Electric Light and Connecticut Power companies, and for many years in charge of engineering and power plant construction for both utilities, is to retire from that position on January 1, 1947. His assistant, FRED D. KNIGHT, of West Hartford has been elected to succeed him. Mr. Soren will continue as a director of both companies and has been retained as consulting engineer.

A native of Boston and a graduate of Harvard, Mr. Soren was, until 1916, electrical engineer for General Electric Co. He was located at its Schenectady Plant until 1895 when he became district engineer at Atlanta, Ga., and a year later took charge of construction for Metropolitan Street Railway, N. Y., also being identified with electrical installation for Interborough Rapid Transit System, the Hudson River tunnels and N. Y. Central Railroad electrification. Joining Hartford company in 1916 he took charge of plant and system extension programs, and under his direction pioneer commercial applications of mercury vapor process were made at Dutch Point and South Meadow stations, with challenging implications based on many years of economical operation at Hartford.

Mr. Knight is a native of Limerick, Me., and was graduated from University of Maine as an electrical engineer. Before joining the Hartford company in 1941 he had a long period of service with Boston Edison Company, where he filled the position of superintendent of production. Previously, he was construction superintendent for the Stone & Webster Engineering Corp., in charge of power plant developments in numerous states. He was superintendent of construction in that capacity on the original development of South Meadow station at Hartford in 1920, and is well known in central station operating circles, having also been active in work of national engineering committees of Edison Electric Institute and Association of Edison Illuminating Companies.

V. M. MARQUIS has been appointed systems planning and operating engineer of the electrical engineering division of the American Gas & Electric Service Corp., New York. Since September 1945 Mr. Marquis has been assistant chief of the division of transmission and hydraulic engineering of the Pacific Gas & Electric Co. Before entering government service during World War II, he had been connected with the American Gas & Electric System.

Mr. Marquis was graduated from Stanford University in 1921 as a mechanical engineer and the following year received his degree of electrical engineer. While taking the test course of the General Electric Co., he earned a master of science degree at Union College. Thereafter he served with G. E.'s a-c engineering department. In 1928 he became identified with A. G. & E.

He joined the Power Branch of the old Office of Production Management in 1942 to work on power supply problems, later becoming chief of the western regional unit of the Power Division's Power Supply Section, in charge of power supply for eleven Pacific Coast States. It was on January 1, 1945, that Mr. Marquis was named director of the office of War Utilities' Power Division, when Barclay J. Sickler resigned. His connection with P. G. & E. followed in the fall of 1945.

CLAYTON P. YODER who left the Buffalo Niagara Electric Corporation recently has announced the formation of a sales agency, C. P. (Bill) Yoder, 130 West Chippewa Street, Buffalo 2, New York. He will sell various types of electric heating equipment, utility line materials and other equipment to industries in New York state and western Pennsylvania.

Mr. Yoder first became interested in electric heat in 1910 while connected with General Electric Company and was one of the first to demonstrate that a hydrogen atmosphere furnace doesn't have to be treated as a deadly bomb. After many years with G. E., the last ten of which he was head of the Standardizing Laboratory at Erie, Mr. Yoder went, in 1926 to the Erie County Electric Company, Erie, Pa., as Power Sales Engineer and later was promoted to Sales Manager. Since 1931 he has been in Buffalo, as Industrial Heating Engineer; Manager, Power and Heating Bureau and later, Manager, Commercial and Industrial Bureau of Buffalo Niagara and Eastern Power Corp.

An Associate of American Institute of Electrical Engineers since 1918, Mr. Yoder was one of the organizers and first chairman of the Erie Section. He also served as a member of the Committee on Electrochemistry and Electrometallurgy. As a long time member of the Power and Heating Committee of Edison Electric Institute he authored that committee's publications "Electric Steam Generators" and "Electric Melting Furnaces," and recently revised the "Electric Heating Section" of the Power Sales Manual. These activities and a number of contributions to electrical magazines, have brought him recognition in the field of industrial electric heating. Other technical and trade activities included member of Board of Directors, Buffalo Chapter, American Society for Metals, and Electric Association of Niagara Frontier.

New Jersey Power and Light Company has announced the appointment of JOSEPH A. SHERRY as director of Advertising and Publicity. Mr. Sherry will report directly to William F. Moses, vice president in charge of Customer and Employee Relations, at the company's offices in Dover.

For ten years advertising manager of the Washington New Jersey Star and later editor and publisher of the Hackettstown Courier-Post, Mr. Sherry has more recently been employed in the Public Relations Department at Picatinny Arsenal.

Mr. Sherry succeeds C. FRED WESTIN whose resignation from the company becomes effective December 31, 1946. Mr. Westin has accepted a position with Public Service Gas & Electric Corporation of New Jersey. He will be employed in the Advertising Department in Newark, New Jersey.

JAMES M. STAFFORD, JR., acting advertising manager of the Georgia Power Company has accepted a position as director of advertising and publicity for the United Light and Railways Service Company with headquarters in Kansas City, Mo.

He will direct the advertising programs of eight companies in the electric, gas and transportation business in Missouri, Kansas, Iowa and Illinois. The Kansas City Power and Light Company is the largest of the group.

Mr. Stafford joined the Company in 1925, following his graduation from Oglethorpe University, Atlanta, and the

Harvard Graduate School of Business Administration. Until the present he has spent his entire business life in the Georgia Power Company's advertising department and has attained a position of prominence in the utility business and advertising circles.

He was editor of the P.U.A.A. Bulletin in 1943 and its southeastern correspondent for several years. He also served as chairman of the employee activities committee of the Southeastern Electric Exchange.

Mr. Stafford is recognized as one of the most able and progressive men in the utility advertising industry. Under his direction, the Georgia Power Company's advertising and public relations activities won numerous national and regional awards in annual P.U.A.A. competitions.

In 1940 he won the annual B. C. Forbes award, administered by the Edison Electric Institute, for the "most meritorious paper dealing with the subject of public relations in the electric light and power industry."

Mr. Stafford is a native of Florence, Ala., and attended public schools in Tennessee, Mississippi and Florida before entering Oglethorpe University.

COL. WILLIAM KELLY, chairman of the executive committee of the Buffalo Niagara Electric Corp., has been appointed community chairman for Buffalo of the Committee for Economic Development.

Announcement of changes in duties for two Pennsylvania Electric Company officers and the resignation of a third has been made by D. W. Jardine, president. P. R. LAWSON, treasurer, was elected comptroller to replace C. H. EDLUND. R. F. PRUNER, secretary, was elected to the newly combined office of secretary-treasurer. Mr. Edlund announced his resignation to accept a position as vice president and director of the Staten Island Edison Corporation, Staten Island, N. Y. All changes become effective January 1.

Mr. Lawson has been treasurer of Penelec since January, 1944. A native of Jamestown, N. Y., he attended Jamestown High School, University of Syracuse and received a degree in accounting from N. Y. University where he has also done graduate work in finance and economics. Mr. Lawson began his business life in 1925 when he became affiliated with Associated Gas and Electric System at Ithaca, N. Y. Two years later, he transferred to New York City, and until 1944, did accounting and financial work for the System. His last position with this organization was treasurer of the Associated Electric Company.

Mr. Pruner is a graduate of Ebensburg (Pa.) High School and of Pennsylvania State College. He began his business career in 1925 when he was employed by the American Bridge Company. He joined Penelec in 1927 as a traveling auditor and except for the year 1929, when he transferred to the System headquarters in New York City, has been located at the Company headquarters in Johnstown. Mr. Pruner was named general auditor for Penelec in 1930 and elected secretary in 1937.

Mr. Edlund, Penelec's resigning comptroller, has been associated with utility operations for 29 years. Born in Brockton, Mass., he was graduated from Brockton High School and received his business training at the Bently School of Accounting and Finance in Boston. He was first employed as office boy at the Brockton Edison Company, and until 1928, worked in an accounting capacity for numerous electric, gas and transportation companies under Stone and Webster management. From 1928 to 1935, he was employed by electric utility holding companies in New York City. He joined the Associated Gas and Electric System in 1935 with headquarters in New York, and in 1944 was elected comptroller of Penelec with headquarters in Johnstown.

Announcement has been made by the Columbus and Southern Ohio Electric Company, Columbus, of the appointment of FRANK H. STREIT to the position of chief design engineer and of FRED CAMPBELL as assistant design engineer.

Mr. Streit received his early engineering experience with the Los Angeles Gas and Electric Corp., and after this company was sold to the City of Los Angeles he continued with the properties as underground engineer. He then went to Santa Cruz, where as electric superintendent he had charge of electric operations for the Coast Counties Gas and Electric Company. From 1939 to 1943 he served as senior design engineer for the Hawaiian Electric Company, Ltd., at Honolulu, T. H. During the three following years he was connected with the staff of Columbia University in the Division of War Research as an administrative engineer in the Naval Ordnance development. He then spent a few months with the U. S. Engineering Department at Oak Ridge, Tenn., as assistant chief of operations and executive officer of the electro-magnetic uranium isotope separation plant.

Following graduation from Washington University, St. Louis, Mo., Mr. Campbell became identified with the General Electric Company at Schenectady, taking the test course and in the switchgear department. He was then transferred to the Chicago offices of G. E. as switchgear engineer. In 1926 he joined United Light and Power Company, the position he retained until his new assignment.

PAUL B. METCALF has been appointed executive assistant to Walker Mason, executive vice president of the Narragansett Electric Company, Providence, Rhode Island, following several months as executive assistant in the office of Vice President William Webster of the New England Power Association, Boston.

Mr. Metcalf has been identified with the New England Power System since 1918, in connection with steam plant operations, and has had contacts with various government boards in Washington, D. C. He served in World War I in the field artillery, and in World War II in army staff duties in England, France and Germany. Part of his work was restoration of generating plants in the Rhineland, and for a time he headed the utility section of the military government in Bavaria.

ALBERT C. GOWING has been named assistant chairman of the distribution standards committee, New England Power System, Boston. After being employed by the Boston Edison and Weymouth Light and Power Companies, he engaged in independent industrial and appliance sales work. In 1921 he joined the Union Light and Power Company, Franklin, Mass., as an engineer and was its manager from 1936 to 1945, when he was made local manager of the Franklin office of Worcester Suburban Electric Company.

JOHN F. CONROY, in charge of sales for the Franklin-Milford area of the Worcester Suburban company and former district sales manager of the Frigidaire Sales Corp., Boston, succeeds Mr. Gowing at Franklin. HARLOW H. DROWN has been made merchandising supervisor of the Worcester Suburban company with headquarters at Milford,

Mass., following extended sales responsibilities with the company at Uxbridge and Marlborough.

RAY W. BRASWELL, assistant to chief engineer of Louisiana Power and Light Company is leaving the company to become operating superintendent of the Mississippi Power and Light Company. Mr. Braswell has been with the Louisiana utility for 20 years. In 1928 he became an engineer for Phoenix Utility, an associated company, and in 1930 became division engineer for Louisiana Power and Light. He has been assistant to the chief engineer since 1940.

CHARLES E. OAKES, president of the Pennsylvania Power and Light Company, Allentown, was elected president of the Pennsylvania Electric Association at the annual meeting held recently in Hershey.

Mr. Oakes became head of the Pennsylvania Power and Light Company last year, going to Allentown from the Birmingham Electric Company of which he had been president for six years. Before becoming chief executive of the Birmingham properties he had been identified with Pennsylvania Power & Light, joining the staff in 1923. After serving in various departments of the company he was made manager of the Allentown division, a position he occupied for twelve years. His early experience was obtained in Oregon and Idaho.

Vice presidents elected at the PEA meeting included: G. W. OUSLER, vice president in charge of sales, Duquesne Light Co.; W. H. DORAN, vice president, Metropolitan Edison Co.; and D. W. JARDINE, president, Pennsylvania Electric Company.

CLYDE A. MULLEN has been appointed to the newly created office of vice president in charge of operations of Jersey Central Power and Light Company, with headquarters in Asbury Park. Mr. Mullen has been general superintendent of operations since July, 1945.

In the 33 years Mr. Mullen has been identified with the electrical industry, he has had a varied and well-rounded operating experience which began in Zanesville, Ohio, his native city, with the Ohio Electric Railway. Later, as assistant engineer of tests, he was affiliated with the Penn Central Power and Light Company. Returning to Ohio in 1914, he became electrical engineer of the Ohio Service Company. In 1923 he was appointed superintendent of substations, later transferring to Pennsylvania Power and Light Company as assistant superintendent of construction.

It was in 1927 that he moved to Asbury Park where for four years he was superintendent of operations of the former Eastern New Jersey Power Company. Upon purchase of that company by Jersey Central Power and Light Company in 1931 he became superintendent of the Morristown division. He then became general superintendent.

CONVENTIONS AND MEETINGS

1947

JANUARY

13-15	Canadian Electrical Association, annual winter conference, Chateau Frontenac, Quebec City, Que.
16-19	American Society of Civil Engineers, New York, N. Y.
27-31	American Institute of Electrical Engineers, New York, N. Y.

FEBRUARY

3-4	Prime Movers Committee, EEI, Van Curler Hotel, Schenectady, N. Y.
5-7	Missouri Valley Electric Association, Annual Power Sales Conference and Industrial Power and Heating Section, EEI, Hotel Continental, Kansas City, Mo.
10-11	Transmission and Distribution Committee, EEI, Atlanta Biltmore Hotel, Atlanta, Ga.
10-12	Meter and Service Committee, EEI, Robert Treat Hotel, Newark, N. J.
12-13	Electrical Equipment Committee, EEI, Atlanta Biltmore Hotel, Atlanta, Ga.
13-14	Pennsylvania Electric Association, Systems Operation Committee, Lord Baltimore Hotel, Baltimore, Md.
20-21	Pennsylvania Electric Association, Electrical Equipment Committee, Penn-Harris Hotel, Harrisburg, Pa.
20-21	Pennsylvania Electric Association, Transmission and Distribution Committee, Penn-Harris Hotel, Harrisburg, Pa.

MARCH

2-5	American Society of Mechanical Engineers, Spring Meeting, Tulsa, Okla.
3-5	National Electrical Manufacturers Association, Edgewater Beach Hotel, Chicago, Ill.
3-5	Canadian Electrical Association, Western Conference, Vancouver, B. C.
March 31-April 3	Thirteenth Annual Sales Conference, EEI, Edgewater Beach Hotel, Chicago, Ill.

APRIL

3-5	Southeastern Electric Exchange, Annual Conference, The Vinoy Park Hotel, St. Petersburg, Fla.
7-9	AGA-EEI National Accounting Conference, Hotel Statler, Buffalo, N. Y.
16-18	Missouri Valley Electric Association, Engineering Conference, Hotel Continental, Kansas City, Mo.
28-30	Engineering Committees, EEI, Edgewater Beach Hotel, Chicago, Ill.

MAY

5-9	National Electrical Wholesalers Association, Hotel Traymore, Atlantic City, N. J.
27-29	National Association of Purchasing Agents, Chicago, Ill.

JUNE

2-5	EDISON ELECTRIC INSTITUTE, Annual Meeting, Atlantic City, N. J.
18-20	Canadian Electrical Association, 57th Annual Convention, Algonquin Hotel, St. Andrews, N. B.

Atomic Energy

(*Continued from page* 411)

from radioactive handicaps, would mean to aviation. The release of atomic energy is not dependent upon a supply of oxygen, so it would not be affected by high altitudes. Its use would eliminate the great load of fuel now required for long distance flights. It might revolutionize the use of gas turbines or of jets for propulsion of airplanes or of rockets.

Considering all the probabilities, there is little reason to fear that the coal miner will lose his job at any time in the measurable future, because the growth in demand for power and heat will absorb all the energy likely to be developed from uranium without scrapping our coal-burning plants.

The radioactive isotopes produced by fission are a very great handicap to the power man, and as a by-product there seems to be little hope that they will contribute appreciably to the economic development of power. It is not impossible, however, that they may eventually be of more benefit to the human race than the energy released from the atom.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

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H. S. BENNION, *Vice-President and Managing Director*....420 Lexington Ave., New York 17, N. Y.
K. B. CRUMB, *Treasurer*.....American Gas & Electric Service Corp., New York, N. Y.
MAE B. WOODS, *Secretary*.....420 Lexington Avenue, New York 17, N. Y.

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WILLIAM KELLY.....Buffalo Niagara Electric Corp., Buffalo, N. Y.
FRANK KRUESI.....Middle West Service Co., Chicago, Ill.
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H. T. PRITCHARD.....Indianapolis Power & Light Co., Indianapolis, Ind.
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The Executive Committee consists of the following members of the Board of Directors: Messrs. W. C. Bell, H. B. Bryans, W. H. Burke, William Kelly, C. E. Oakes, P. H. Powers, W. H. Sammis, E. C. Stone, P. S. Young.

Lippincott Lib

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

(Continued)

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Customer Activities, W. E. STURM.....West Penn Power Co., Pittsburgh, Pa.
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Prime Movers, R. M. VAN DUZER, JR.....The Detroit Edison Co., Detroit, Mich.
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